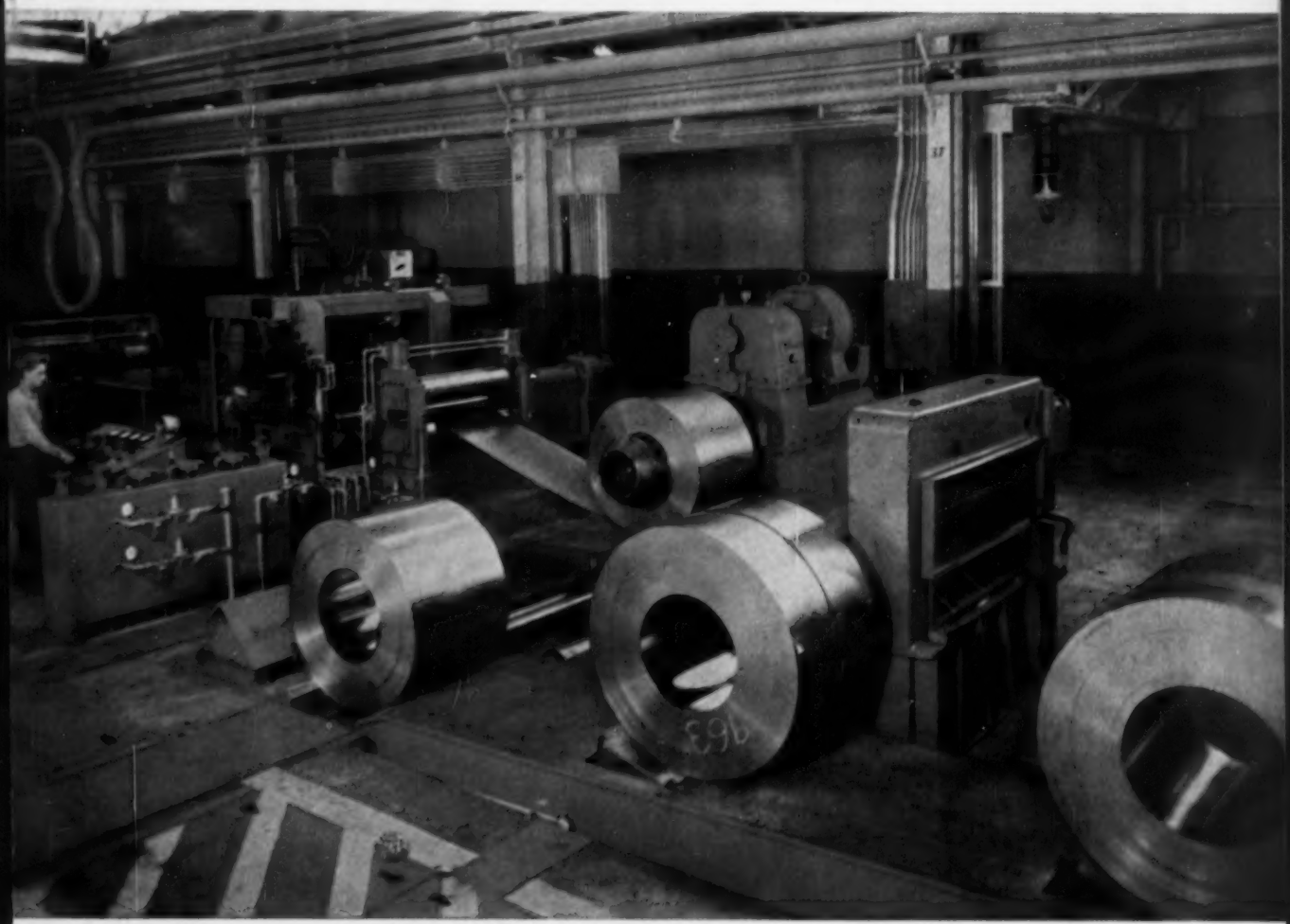
A Chilton Publication

The Iron Age

THE NATIONAL METALWORKING WEEKLY • JANUARY 20, 1955

Arctic Metallurgy
See page 79



Coil Entry Section — Wean Galvanizing Line

The WEAN ENGINEERING COMPANY · INC.
Warren, Ohio

Typical of Wean Advanced Engineering is this continuous hot dip galvanizing line that produces a vastly improved zinc coat steel at greatly increased speeds. Heavier coatings, tighter bonding and greater uniformity are now possible at reduced costs. It's this kind of never ending search for better ways of making better steel products that has established Wean as the nation's foremost designer and builder of sheet, tin and strip mill equipment.

SPECIALISTS IN SHEET, STRIP AND TIN MILL EQUIPMENT

400-FOOT MAGNESITE KILN — GABBS, NEVADA, WORKS

GRANULAR BASIC

REFRACTORIES

Four different types of granular magnesia refractories are produced in this kiln—each serving specific applications. Selective mining, air fluidized blending, and briquetting insure uniformity of composition in all four dead burned magnesite products.

BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

His Specialty Is Speed

When steel men discuss bar mills, you sometimes hear them say, *the faster the mill the better the mill.* What they mean is this: the faster the billet passes through the mill, the easier it is to maintain the desired temperature of the finished bar. And that's important, because consistent temperature-control ensures finished bars of uniform size and section.

The man shown here is a real specialist in speed. He's the "speed operator" at one of the fastest bar mills in the country—Bethlehem's high-speed continuous 10-inch bar mill at the Lackawanna, N.Y., plant. This mill can hot-roll a 30-foot, 4 x 4-inch billet into, say, 1-inch rounds in less than two minutes, delivering the finished bars to the coilers or the cooling beds at a speed of about 2400 ft per min.

The job of setting up the right speed for each of the eighteen pairs of rolls, and synchronizing the rapid flow of steel through these rolls, is the speed operator's primary responsibility. That's why he has to be thoroughly trained, experienced, alert.

Good men working with good equipment, that's the formula for a top-notch product—like Bethlehem Hot-Rolled Carbon Bars.

As a user of carbon bars, you will be interested in a 32-page booklet, "Guide for Selection of Carbon Steel Bars," prepared by our metallurgical staff. It gives you the basic information needed to choose the type and grade of carbon bars that will best meet your requirements, and includes 6 pages of helpful engineering data sheets. Write to us, attention of Publications Department, for your free copy.

And when you're in the market for hot-rolled carbon bars, we suggest that you place your order with the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM HOT-ROLLED CARBON BARS

STANDARD SECTIONS • SPECIAL SECTIONS • BAR SIZE SHAPES

BETHLEHEM STEEL

the Iron Age

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Vol. 175, No. 3, January 20, 1955

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THE IRON AGE, published every Thursday by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.50. Cables: "Ironage," N. Y.

Address mail to 100 E. 42 St., N. Y. 17, N. Y.

NEWS DEVELOPMENTS

AUTO WAGE SETTLEMENT MAY SET STEEL PACE—P. 39
Since automotive industry labor contracts end one month earlier than steel industry's, the UAW agreement could set the floor or ceiling for steelworkers. Having Walter Reuther lead off may or may not be a twist to Dave McDonald's liking. One basic difference between the unions will be that the UAW will drive for a guaranteed annual wage while the USW won't. Forecast 8¢ to 10¢ steel wage boost with compensating price hike of $4 to $5 a ton.

TITANIUM CASTING TAKES A GIANT STEP — P. 41
Wisconsin Centrifugal Casting Co. ready to start commercial production of centrifugal cast titanium alloy parts. Together with Armour Research Foundation, the firm has produced these up to 5-in. diameter, 9-lb weight. Sizes will increase soon. Will enter market now dominated by forgings.

INDUSTRY TRADES TIPS ON COST CUTTING — P. 45
During last year's torrid competition a good many companies learned new lessons in cost cutting. At an AMA meeting in Cleveland last week they exchanged tips on how they did it. Areas of savings ranged through purchasing, inspection, production and handling.

CONSTRUCTION BACKS OPTIMISM ON 1955 — P. 53
Construction contract awards in December ran a whopping 41 pct ahead of same month last year. Since this represents work to be started in near future it assures building industry a good start in '55, is first definite evidence to back up all the optimistic business forecasts that have been made.

NO PROSPECT FOR ATOMIC POWERED AUTOS — P. 56
The need for practical shielding of radioactive elements makes the problem insoluble in view of today's scientific knowledge. Lead shield would weigh 40 tons. Auto industry is learning the many uses of radioactive isotopes for testing of wear and imperfections in metal parts.

IKE, STASSEN PUSH FOR MORE RED TRADE — P. 61
Administration believes an increase in non-strategic trade with the Reds would cut into the Communists' world strength. But many members of Congress disagree. So the President and his Foreign Aid Chief are mapping plans to sell Congress on the idea.

IN METALWORKING

ENGINEERING & PRODUCTION

ARCTIC POSES METALLURGICAL PROBLEMS — P. 79
Equipment built for use in Arctic areas is subjected to unusually severe ground conditions and extremes in weather. In addition, metallurgical problems are compounded by an intangible factor called the "windchill effect." Studies of metal failures show that the inadequacy of ordinary steels for low-temperature use is probably the greatest cause for such failures.

TRUCKS REDUCE FOUNDRY HANDLING COST — P. 83
Power trucks have mechanized almost all material handling at Westinghouse Electric's Trafford foundry. They carry unit loads of raw materials, patterns and castings. The three basic trucking methods are skid-lift, pallet-fork and tractor-trailer. By efficient planning, only 18 trucks are needed to serve the entire plant.

THREE JOBS DONE BY VERSATILE MACHINE — P. 86
Simultaneous milling, drilling and tapping of small parts, and elimination of handling operations and separate machining setups, have helped to cut manufacturing costs. Machine versatility permits short runs.

LAMINATED PLASTICS IMPROVE ROLL LIFE — P. 90
Roll life in a large tinplate producer's plant has been greatly improved through use of laminated plastic-covered rolls. They are claimed to have greater acid resistance, higher density, longer wearing properties.

TEMPERATURE CONTROL EXTENDS POT LIFE — P. 92
Modern research has taken the mystery out of what happens in the hot dip galvanizing pot as temperature rises. A better understanding of the mechanics of zinc-iron alloy formation has resulted in longer pot life. The best bet for long equipment life is to keep galvanizing bath temperature under 885°F and apply heat uniformly. Above 900°F, dissolving action is more violent.

MARKETS & PRICES

PREDICTS WORLD-WIDE SCRAP SHORTAGE — P. 42
Economist Eliot Janeway predicts a world-wide scrap shortage beginning in 1955 and lasting for some years. He reports fears are already mounting here that the export drain may aggravate our own domestic problem. And he predicts the political overtones of the struggle for scrap will echo in Washington.

APPLIANCES HEADING FOR NEW RECORDS — P. 47
From a standing start in 1954, appliance manufacturers pushed to record sales heights. In 1955 they say they'll do it again. Only this year they are starting strong. Second quarter steel supplies are expected to be tight. A fresh look at inventories shows they are not as large as some had thought.

STEEL MARKET STILL HASN'T HIT ITS PEAK — P. 119
Although the ingot rate is currently showing signs of stabilizing, the steel market still hasn't reached its peak. New orders are still being booked faster than finished steel is being turned out. This week there are signs that oil country demand is about ready to get its second breath. The tinplate outlook is brighter, too. And plate orders are beginning to edge up again. First half looks very good.

AUTOMAKERS BUYING SECOND-QUARTER STEEL—P. 120
Several car producers already buying cold-rolled sheets for June delivery. Possible UAW strike could chill market. Plate market gets shot in the arm from projected 430 mile gas pipeline project.

ALUMINUM OUTPUT HITS 1.46 MILLION TONS—P. 126
December climaxed a year of many new records by setting still another new high for monthly aluminum production—127,056 tons. This brought the 1954 total to the expected new high of 1,460,056 tons, topping the 1953 record by 208,572 tons. Price round over as Alcoa, Kaiser lift prices 1¢ per lb.

NEXT WEEK:

PEROXYGEN COMPOUNDS: ROLE IN SURFACE TREATING
Use of peroxygen compounds is often a necessity in applying surface treatments to metals. In other cases, their use offers definite advantages. Hydrogen peroxide, for example, increases color intensity and adherence of black finishes on zinc and cadmium. They are also useful in etching and brightening treatments.

WHAT'S BEHIND THE URANIUM BOOM?
Uranium is the most spectacular—and controversial—segment of the mining industry today. Flying prospectors have struck it rich, or gone broke. But the boom itself is solid—there's plenty of ore, and there's a politically assured military market for years to come.

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Today hundreds of Jeffrey drums are rolling out valuable concentrate in ore treatment plants, with remarkable recovery at high feed rates. Millions of pounds of iron are thus added to our supply.

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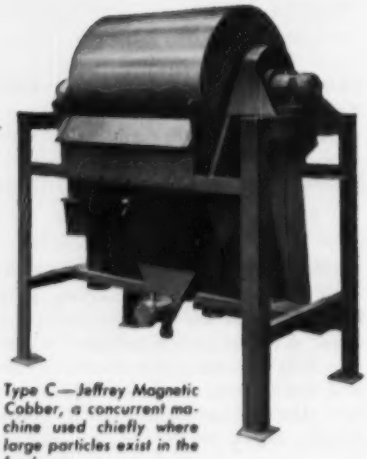
Jeffrey Ore Beneficiation Engineers will study your separation problem and recommend the ideal installation.



Type C—Jeffrey Magnetic Cobber, a concurrent machine used chiefly where large particles exist in the feed.

WRITE FOR DESCRIPTIVE LITERATURE AND TECHNICAL DATA.

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☐ Send me your booklet, "Armco Welded Steel Tubing."

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

Editorial:

Helpful Hints For Executives

CHANCES are most of us have already broken our first-of-the-year resolutions—if we made any. Maybe this is the time to make a few belated ones which will stick. Perhaps they should be labeled "Simple Guides to Better Business." Here are a few:

¶ If you have a job to fill in your organization this year look to your own staff in filling the gap. Don't go outside unless circumstances force you to do this. Even then give the picture a second look.

¶ Check communications with your people. Is the system working? Are things you think and believe in reaching employees on a clear-cut and simple basis? If not, do something about it.

¶ When salesmen call on you give them the same treatment you expect your own salesmen to get when they are out in the field.

¶ See that phrases such as: "He's in conference," "He has gone for the day," or "He's tied up with important business" are eliminated in your organization. Just have people say you're not available at the moment. But that you or someone else will return the call.

¶ When you notice that some of your callers are in a belligerent frame of mind by the time they see you investigate and find out why. Then take constructive action.

¶ Save money and space by throwing away immediately all letters and reading matter which you will not have to refer to again.

¶ As often as you can, have lunch with someone you know is in a totally different type of business. It may prove valuable as well as interesting.

¶ Leave your bulging briefcase at the office. It is hard to believe but it is a fact that your efficiency for getting work done at home is bound to be low. It will be low next day in the office, too.

¶ Keep your troubles to yourself. Everyone has his own and is not likely to stand still long enough to hear yours. Saving time this way gives you more time for constructive thoughts and discussion.

¶ Step up your reading habits if you expect to keep abreast of what's going on. Almost any national or international factor affects you in some way or other.

¶ When you get fed up with what you're doing and feel as if you're in a squirrel cage—relax. Things probably won't change a bit.

Tom Campbell

EDITOR

Transmission support cross member for automobile frame. Bolted, riveted and welded assembly. 21½" long; 8" high; 4" wide.
230 gallon pylon tank. .025" steel; 26.05" dia. at center; 153.82" long.
Box car roof carline. ½" steel; 112⅝" long; 4½" deep at center.
Shaft bracket. .1345" steel; 8⅛" long; 6½" wide; 1⅛" flange.
Welded bracket. ⅜" low alloy steel; 13¼" high; 12⅜" wide; 11¼" deep.
Diffuser for commercial oil burner. ¼" stainless steel; 11" dia.; 3⅞" deep.
Deep drawn body. .0747" steel; 6½" deep; 11⅛" dia.
Simple—Complex!
Big—Little!
Any Analysis!
When You Need Pressed Metal Parts—
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Get the Cold Facts on Cold Formed Metal Parts from Parish.
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dear editor: *letters from readers*

New Solution

Sir:

Page 34 of your Dec. 23 issue showed a cartoon "This Ends the Back Seat Driver Problem" which amused me highly. I consider it one of the best you have had in years. If the original is still available, I would be pleased if you could kindly send it to me. I would like to hang it up in my laboratory for my and others' enjoyment. *Ernest Mueller, Consultant, East Orange, N. J.*

Color Photography

Sir:

In your Nov. 11 issue under Newsfront, appears a reference to a large tool manufacturer using color photography in the study and recording of data from corrosion tests.

We shall appreciate knowing the name of the company to which the reference is made. *V. F. Schubert, Vice-President, Sandusky Foundry & Machine Co., Sandusky, O.*

Details on this recording method may be obtained from Mr. Hanford, Asst. Chief Metallurgist, Stanley Works, New Britain, Conn.—Ed.

Liquid Primer

Sir:

In the Dec. 23 issue of THE IRON AGE you have an article that is of keen interest to me. This article is on your Newsfront page, titled, "Primer: Increases Corrosion Protection."

How can we find out more about this product and also who puts it out? Painting is one of our big problems and any information would be appreciated. *G. R. Payne, Payne's Iron Works, Bellingham, Wash.*

Details on the corrosion resistant primer called "LockPrime" may be obtained by contacting the Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.—Ed.

Cost System

Sir:

We read with intense interest Mr. W. C. Fitts' article in your issue of Sept. 9. It was called "Standard Cost System Pinpoints Excessive Cost Areas, Lowers Operating Expenses." If possible, we would like to obtain five tear sheets of the article. *J. F. Fitzsimmons, Manager of Industrial Relations, Brainard Steel Div., Warren, O.*

Vacuum Melting

Sir:

We enjoyed reading your article "Lid About to Come Off Vacuum Melting" in your Dec. 9 issue. Would you send us two tear sheets? *E. Konrad, The American Platinum Works, Newark, N. J.*

Checklist

Sir:

We found your 15-Point Advertising Checklist which appeared in the Dec. 9 issue quite interesting and would like to have additional copies if available. *H. D. Falls, The Bayless-Kerr Co., Cleveland.*

Shot Peening

Sir:

Will you please send us three copies of the article on shot peening by W. G. Patton, which appeared in the Dec. 9 issue of your magazine? *I. M. Olsen, Industrial Metal Abrasives Co., Jackson, Mich.*

heat treating of stainless steel

- Fully Automatic—no operating personnel required.
- High Purity—completely oxygen-free.
- Safe—NO explosion hazard.
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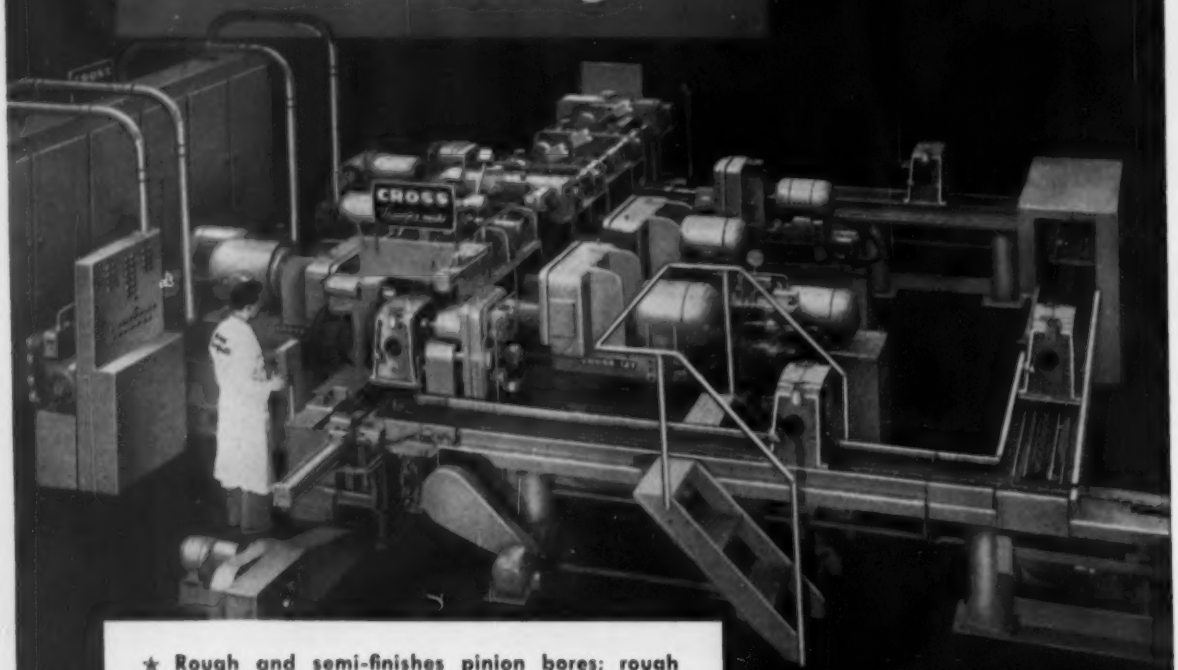
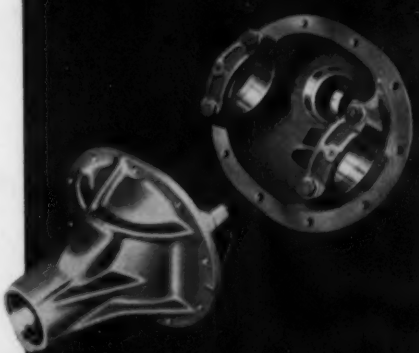


- ★ Rough and semi-finishes pinion bores; rough bores, semi-finish bores and taps cross bores.
- ★ 155 parts per hour at 100% efficiency.
- ★ 9 stations—1 for loading, 4 for boring, 1 for tapping, 2 for indexing, 1 for visual inspection.
- ★ Pallet-type work holding fixtures.
- ★ Hydraulic power wrench for clamping parts.
- ★ Automatic transfer of fixtures from station to station.
- ★ Other features: Complete interchangeability of all standard and special parts for easy maintenance; construction to J.I.C. standards; hardened and ground ways; tandem drive for locating pins; hydraulic feed and rapid traverse; automatic lubrication; oil-mist lubrication for taps; drag-chain type chip conveyor.



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fatigue cracks

by William M. Coffey

Your Government, etc.

We clipped this out of a newspaper.

NEW YORK — Zirconium-hafnium has been surveyed by the Mineral Economics Subcommittee of the Senate Interior Committee on the Accessibility of Stragetic Materials to the United States in Time of War and for Our Expanding Economy. The Committee has recently issued a report of the result of its studies.

For short we'll call this the MESSICASMUSTWOEE Dept. of your government.

* * *

We received this from the Selas Corporation of America.

Officials of the Selas Corp. sometimes get confused by the different names given to the same equipment by various industries. For instance, the corporation's furnace when shipped to a glass factory is called a "lehr"; to a brick manufacturer, it's "kiln"; and to a steel maker, a "furnace." A baker's term is "oven" and to the plastic industries it's a "cracker." Foundries call the same item a "hearth."

Puzzlers

Three warehouse salesmen, having no steel to sell, went on a hunting trip in the north woods. They had good luck, but they suffered for want of that spiritous uplift so necessary to the welfare of a steel salesman. Eventually they became lost and stumbled into the cave of a moonshiner, who, seeing them approaching with guns, mistook them for "Revnooers" and fled. Within the cave they found a 40 quart drum brimful with the cheering liquid. They forthwith decided to share it equally, but not one would sacrifice even a thimbleful to achieve an easy division. The only vessels they could find were two smaller drums marked by the moonshiner as 17 quart and 14 quart capacity, and a 5 quart oil can, all empty, and with tops off. With these they attempted to measure out their shares but without success until nightfall when they lay down to sleep. The first fellow, whose parched throat precluded sleep sneaked up and surreptitiously took a good swig. Later, the second fellow did likewise; ditto the third. Naturally, they all repeated until they could hold no more.

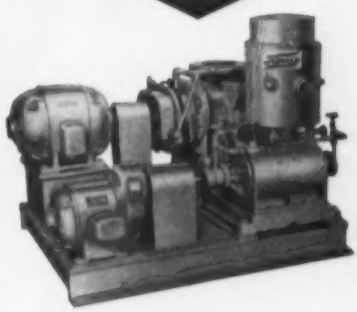
In the morning they resumed the task of dividing the liquor and discovered that they had swigged off just enough to make an equal division of the remainder possible.

How many quarts did they swig off collectively? How did they determine how much was left, and how did they measure out the equal shares?

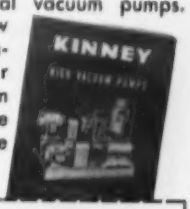
WHILE in Cleveland recently, Ginger Rogers wanted to see a steel mill in operation. Here Andy Saxon, general foreman of the openhearth crew, Republic Steel, is answering questions.

. . . and they say THE IRON AGE isn't a family magazine.

NEED HIGH CLEAN VACUUM FAST?



The new Kinney Model KMB Vacuum Pump produces eight times more vacuum pumping speed per pump horsepower than any other mechanical vacuum pump! Unique in principle and revolutionary in performance, this two-stage positive displacement pump produces a clean, high vacuum specially suited for modern high vacuum metallurgical processes . . . there's no liquid sealant in the main rotor unit to backstream into the vacuum system and contaminate the process. The second stage pump can be equipped with the Kinney **Controlled Gas Ballast** valve to prevent vapors condensing within the pump . . . keeps oil clean for continuous operation. Learn more about this latest addition to the largest line of mechanical vacuum pumps. Write for our new Bulletin 400 or contact one of our competent vacuum engineers in the Kinney district office nearest you.



KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3634 Washington Street • Boston 30 • Mass.

Please send Bulletin 400.

Name_____
Company_____
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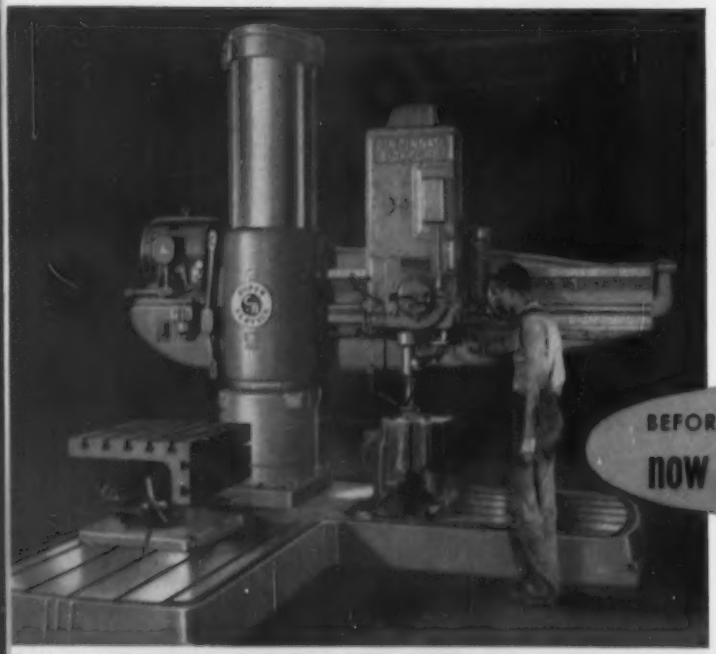
City_____ State_____

BICKFORD cuts floor to floor time!



BEFORE 38 MINUTES
now 23 minutes

BEFORE 5 HOURS
now 3 hours

These two jobs are done with time savings at the Ohio Steel Foundry Company of Lima, Ohio.

The machine (upper illustration) is drilling breech rings for guns from 76MM to the 155MM size. In this tough material a 2½" diameter lead hole is drilled and opened up to a 3½" diameter with a core drill.

Machine, below, is drilling 3 5/16" lead holes in a 9-foot Ladle Vale. Holes are opened up with a single point boring tool. Time savings result from the outstanding ease of control, and the power and rigidity of Super Service Radial Drills.

For power, accuracy, easy handling, check on Cincinnati Super Service Radial Drills.

Write for Catalog R-29.

CINCINNATI
BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

dates to remember

JANUARY

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Winter meeting, Jan. 19-20, Hampshire House, New York. Institute headquarters are at 600 Fifth Ave., New York.

SOCIETY OF PLASTICS ENGINEERS, INC.—Annual national technical conference, Jan. 19-21, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 513 Security Bank Bldg., Athens, Ohio.

STEEL PLATE FABRICATORS ASSN.—Annual meeting, Jan. 20-21, Palmer House, Chicago. Association headquarters are at 79 West Monroe St., Chicago.

EXPOSITIONS

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting and Show, Mar. 7-11, Palmer House, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

AMERICAN SOCIETY FOR METALS—Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

MALLEABLE FOUNDERS' SOCIETY—Semi-annual meeting, Jan. 21, Cleveland Hotel, Cleveland. Society headquarters are at Union Commerce Bldg., Cleveland.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Annual meeting, Jan. 24-25, Sheraton-Cadillac Hotel, Detroit. Association headquarters are at 412 Fifth St., N. W., Washington.

PLANT MAINTENANCE & ENGINEERING SHOW—Jan. 24-27, International Amphitheatre, Chicago. Show Management: Clapp & Poliak, Inc., New York.

TRUCK TRAILER MANUFACTURERS ASSN., INC.—Annual convention, Jan. 27-29, Boca Raton, Fla. Association headquarters are at Room 710 Albee Bldg., Washington.

FEBRUARY

CUTTING TOOL MANUFACTURERS ASSN.—Annual meeting, Feb. 2, Detroit Yacht Club, Detroit. Association headquarters are at 416 Penobscot Bldg., Detroit.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 14-17, Conrad Hilton Hotel, Chicago. Institute headquarters are at 29 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Founding Anniversary meeting, Feb. 16, New York. Society headquarters are at 29 W. 39th St., New York.

DROP FORGING ASSN.—Winter Industry meeting, Feb. 17-18, Statler Hotel, New York. Association headquarters are at 605 Hanna Bldg., Cleveland.

MARCH

PORCELAIN ENAMEL INSTITUTE—Pacific Coast conference, Mar. 10-11, Biltmore Hotel, Los Angeles. Institute headquarters are at Dupont Circle Bldg., 1346 Connecticut Ave., N. W. Washington, D. C.

AMERICAN SOCIETY OF TOOL ENGINEERS—Annual meeting, Mar. 14-18, Shrine Auditorium and Exposition Hall, Los Angeles. Society headquarters are 10700 Puritan Ave., Detroit.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 15-16, Drake Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

THESE COMPANIES HAVE FOUND HELLER FINANCING PLANS THE SOLUTION TO OPERATING CASH PROBLEMS

This year, these companies and others will use in excess of one-half billion dollars of Heller cash to solve such financial and operating problems as . . .

meeting competitors' trade terms—

having sufficient cash to buy and stockpile raw materials at best market prices—

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purchasing new equipment or modernizing—

carrying heavy accounts receivable

CASH and special plans geared to individual business operations come from Heller under their diversified financing services. Heller plans do not interfere with management or profits. What you make is yours—yet you can use as little as $25,000 or as much as $3,000,000 for months or years. The cost is economical for you pay only for the money you use as your need varies.

To learn the facts, write for a free copy of our brochure, "Operating Dollars for Every Business."

At the same time you are invited to write in strict confidence about financial problems in your own business to which our services might apply.

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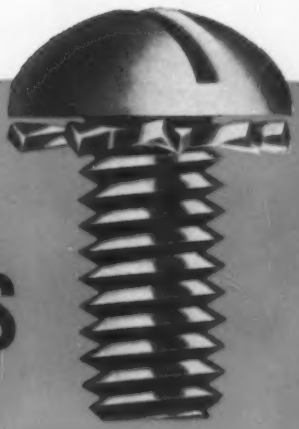
the problem
the answer
Mr. Emerich Bechtold, General Foreman of the Heat Treating Department, and a Gulf Sales Engineer examine the Sems as they emerge from a bath of Gulf Super-Quench.

uniform hardening of SEMS



Gulf Super-Quench

The Shakeproof Division of the Illinois Tool Works had a quenching problem with "Sems" — the well-known screw and lockwasher combination.

Sems are assembled — the lockwasher fitted on the screw—then heat treated. Attaining uniform hardness with conventional quenching oils was difficult, however, because of the difference in size of the heavier screw sections and the normal variations of the steel. The change to Gulf Super-Quench resulted in more uniform hardening, even in the heavier sections, without any cracking of the lockwashers.

Just another example of Gulf Super-Quench's ability to get faster quenching without cracking and distortion, maintain uniform hardness, and cut rejects on many different types of steel parts.

Have a Gulf Sales Engineer help you discover opportunities to put Gulf Super-Quench to work—profitably—in your shop. Contact your nearest Gulf office today and have him call.

GULF

Gulf Oil Corporation • Gulf Refining Company

1822 Gulf Building, Pittsburgh 30, Pa.

The finest petroleum products for your every need

Fabricated by Mercury Plastics Corp.

Perfect cover-up

Another Case for U.S. Royalite

A "perfect" cover for Universal Winding Co.—one of the nation's leading makers of textile winding machines—had to do *more* than just cover part of the machine.

It had to be tough enough to take constant use, a good deal of *abuse*. It had to be *tight-sealing*...*good-looking*...*free of lint-trapping areas*...and relatively *inexpensive*.

Universal found Royalite covers designed and fabricated by Mercury Plastics Corp. of Chicopee, Mass., were *all* this...*and more!*

Covers are easily formed from Royalite sheets over inexpensive tools, with no extra finishing operations required. They are much less expensive than the metal covers formerly used.

What's more, U. S. Royalite brought still other advantages. Its *integral color* matches the machine, can't chip or scratch off. It is *quiet* to handle, and deadens machine noise. Its *formability* allowed an undercut to seal out dirt. And its *flexibility* ended the need for screws or other fastening devices—the cover simply snaps in place!

Whether *you* have a *specific* component or cover problem, or just an *idea* that a certain piece of equipment might be improved, it *will pay you to check on U. S. Royalite!*

U.S. ROYALITE
TOUGH PLASTIC PRODUCTS

US RUBBER

UNITED STATES RUBBER COMPANY
2638 NORTH PULASKI ROAD, CHICAGO 39, ILLINOIS

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ALUMINUM FOIL MILL

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ENGINEERING AND FOUNDRY COMPANY
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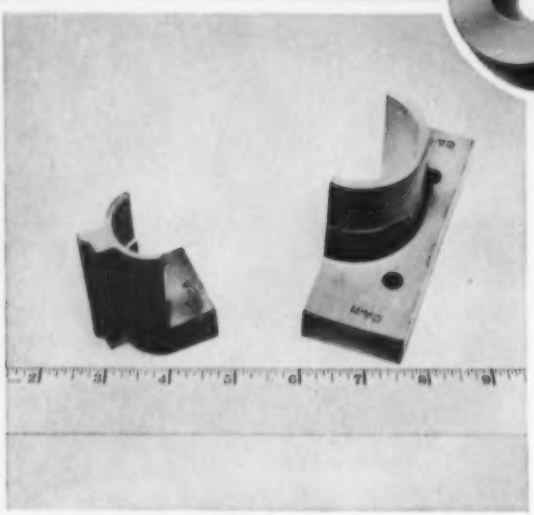
Wilmington (Lobdell United Division)

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Ind.



Look How You Can Save with PREFORMED CARMET®

DIE SECTIONS

these Blanks are preformed to a Finishing Allowance of .018"-.022" per side

Write for Your Copy:
CARMET CATALOG

Just out . . . 32 well-illustrated pages, containing data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order. ● *Write for your copy.*

ADDRESS DEPT. A-61

These tungsten carbide die sections are of Carmet CA-11, a special grade developed expressly for punches, dies, and other heavy shock applications where wear and abrasion resistance are required.

These blanks have a span of 1.315" with a wall thickness of only .046", but they were easily produced to close tolerances by AL's precision preform methods. All surfaces are clean, smooth and free from defects, requiring only a minimum amount of grinding to final dimensions.

Carmet carbides can be accurately produced to practically any shape or size your designs may require, and can be supplied preformed as desired. Typical highly successful applications include inserts for drawing, heading, extruding and blanking dies; gauge and wear parts; pins; bushings; etc.

Find out, TODAY, how you can cut costs with preformed Carmet. Write or call *Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.*

For complete MODERN Tooling, call
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AL® FINE TOOL STEELS SINCE 1854

Safer, Faster Welding With This Double Line Hose

Tu-Line welding hose between tank and torch means extra safety and savings for you. Because the red acetylene and green oxygen lines are securely bonded together with a web of tough rubber, you get *maximum* handling convenience and *minimum* fouling hazards.

Tubes are of specially compounded, non-porous synthetic rubber that resists welding gases. Reinforcement consists of specially treated, high tensile, long staple yarn that insures highest working pressures. Covers are of finest rubber compounds that resist cutting, kinking and the highly abrasive conditions of most welding operations.

Available in I.D. sizes $\frac{3}{16}$", $\frac{1}{4}$" and $\frac{5}{16}$"; in factory reels 400 to 600 feet, uncoupled; or specified lengths, coupled.

Tu-Line for safety and savings.

We also manufacture a complete line of industrial rubber products: belting, hose, packing and moulded rubber of every construction for every need. *Through your Quaker and Quaker Pioneer distributor* our research and engineering services are always available to help you solve any industrial rubber problem. *Write for name of nearest distributor.*

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HKP

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Republic's full line of materials handling equipment fits in beautifully with whatever type of system you use, or intend to use—overhead, truck, conveyor, or any combination.

Republic Boxes, Pallets and Skids keep materials moving, load and unload easily, stack readily, save floor space. Republic Pallet Racks allow you to palletize and stack bulky, odd-lot, fragile and irregular materials. You load or unload from either side, select single pallets from any level without restacking.

Republic Wedge-Lock Steel Shelving is the world's strongest. It supports tremendous weight with no sway, no sag, no buckling. Republic Chain Slings safely handle heavy, hard-to-manage materials. They meet all safety requirements.

Because all this Republic equipment is tough, durable, long-lasting *steel*, you can trust it to deliver long efficient service at lowest per-year cost. Republic specialists will work with you in modernizing your handling setup and in developing special equipment. The coupon below will bring more facts by return mail.

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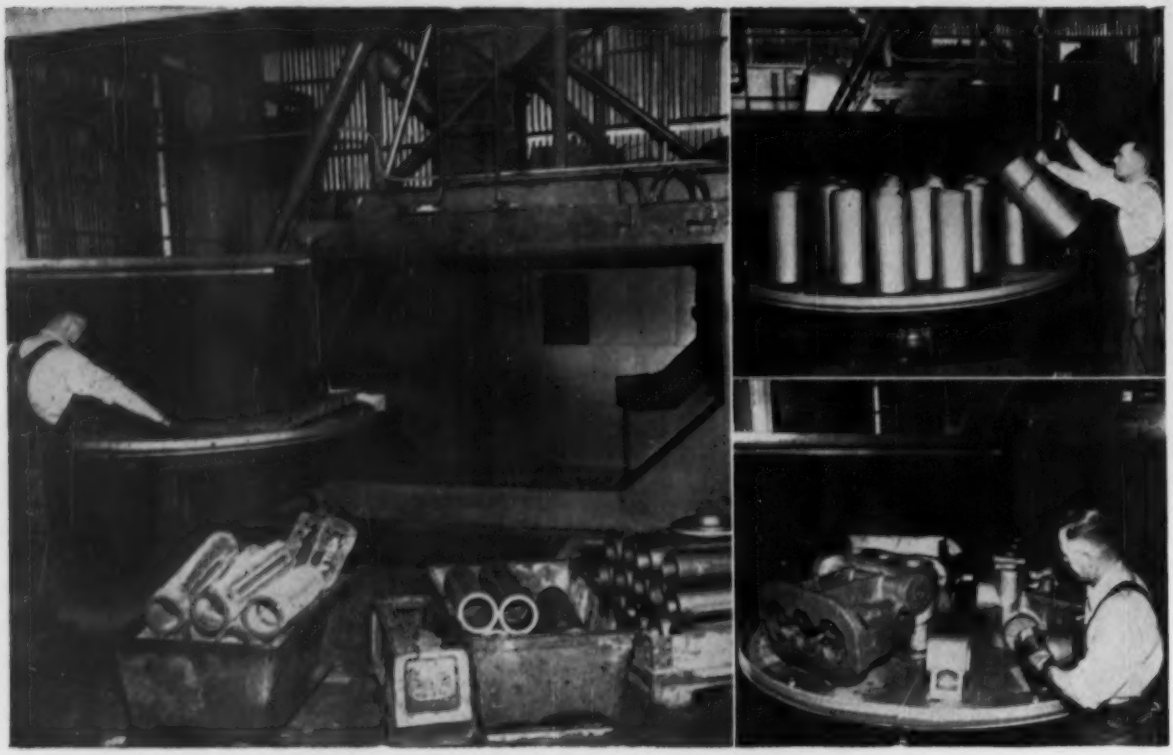
pioneering developments keep **WHEELABRATOR®** *first in blast cleaning*



Wheelabrator Saves in Mass Cleaning of Multiple Products

One Machine Cleans Castings, Mill Steels, Heat Treated Work and Used Parts

Firms making many different sizes and types of metal products with a relatively small volume of each can profit from the experience of the Halliburton Oil Well Cementing Co., Duncan, Oklahoma. Faced with an expanding production of an increasing number of parts, they discovered that the shop-built blasting room was unable to keep pace with cleaning requirements.

The answer to their problems was the installation of an airless Wheelabrator Swing Table. Its operation has proved highly successful in cleaning work of the following types:

1. Heat treated partially machined parts.
2. Rough castings before machining.
3. Mill steels before machining, painting and plating.
4. Used parts to be repaired.

Wheelabrating has cut labor requirements in half. Only one operator is required part time to clean their entire production instead of the 2 men previously needed. Cleaning quality has materially improved with the elimination of the human factor in hand blasting.

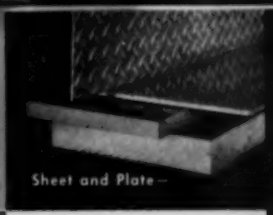
Multiple loading and mass cleaning of this variety of parts has effected a considerable savings in cleaning costs. During the first 4 months of 1953 Halliburton cleaned a total of 633 tons of metal pieces. Of this total, 151 tons consisted of pieces weighing up to 50 lbs. each with an estimated cleaning cost of ½¢ per pound. The balance included parts weighing from 51 to 1250 lbs. each and was cleaned for ¼¢ a pound.

For complete details on Wheelabrator cleaning, send for Bulletin 74-B

American **WHEELABRATOR®** *trail blazer of industrial progress*

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 510 S. Byrkit St., Mishawaka, Indiana

Alcoa
MILL PRODUCTS
The most complete line in Aluminum


Sheet and Plate

Bar Stock

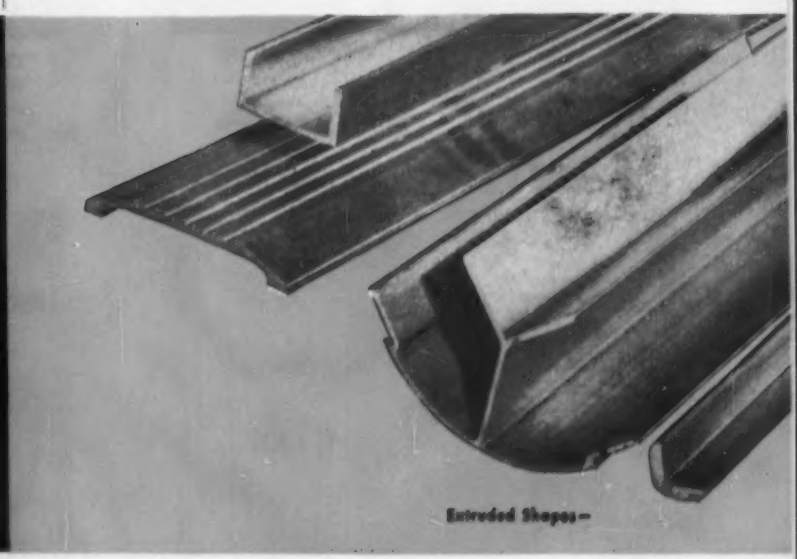
Built-up parts are no bargain; riveting and welding demand too many costly man-hours.

That's why production costs drop when you use aluminum extruded shapes. They take the handcuffs off your designer and allow him to distribute the metal where it's needed. Parts that would be prohibitively expensive to produce by assembly become practical. And while extrusion is not a precision process, tolerances are so close that only surface finishing is ordinarily required. Lengths run to 80 feet, maximum weights up to 600 pounds per piece.

Alcoa operates the world's largest light metal extrusion facilities with 50 presses in five plants. With the experience of 50 years to draw on, Alcoa can show you how to take advantage of a broad line of standard extruded shapes or help you design for your own specialized requirements.

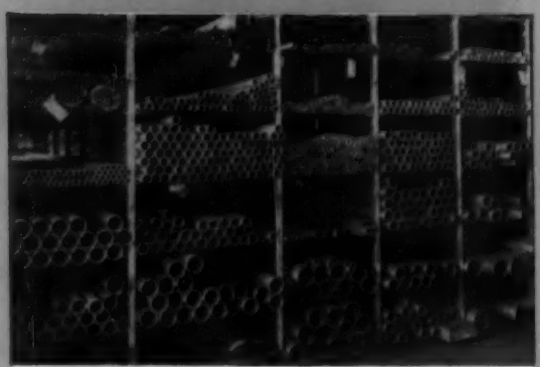
Alcoa
Extruded Shapes

Can put the metal where you want it without time-consuming, costly assembly.

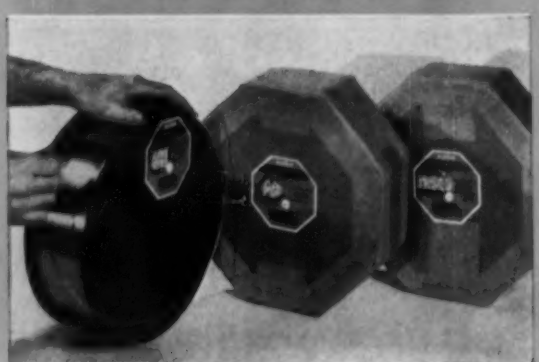

Extruded Shapes

Products of Sixty-Six Years of Pioneering in Aluminum

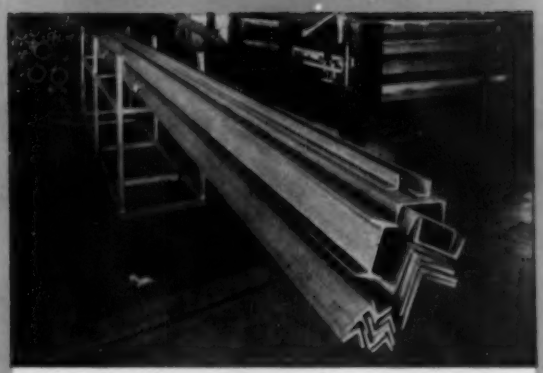
EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.



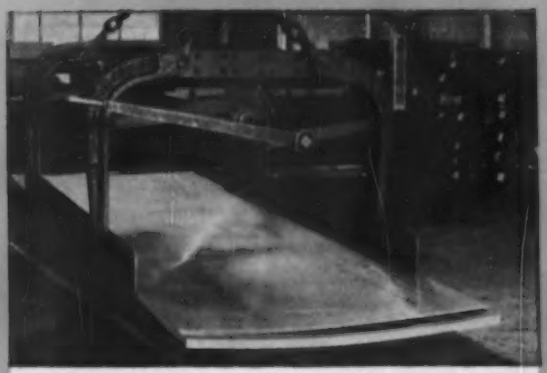
TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.



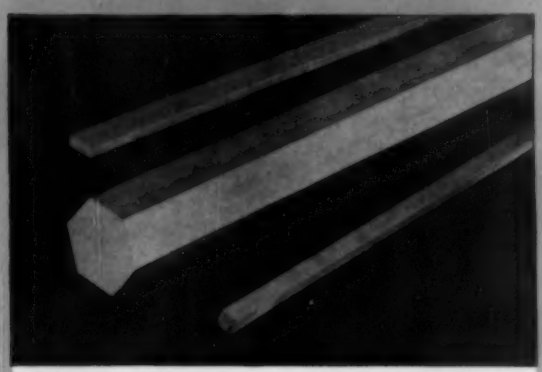
I.G. WELDING ELECTRODE: Available in three alloys and in six diameters. It is level wound on expendable spools in continuous lengths.



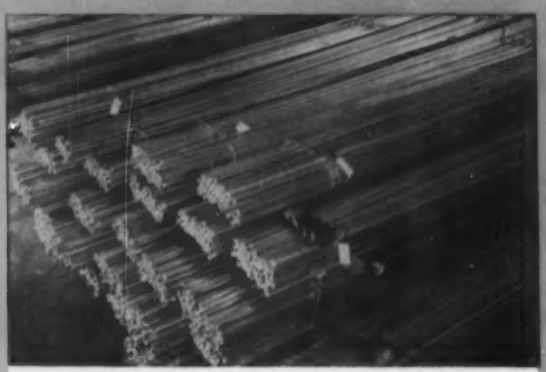
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; tees; zees. Suited to a variety of structural applications.



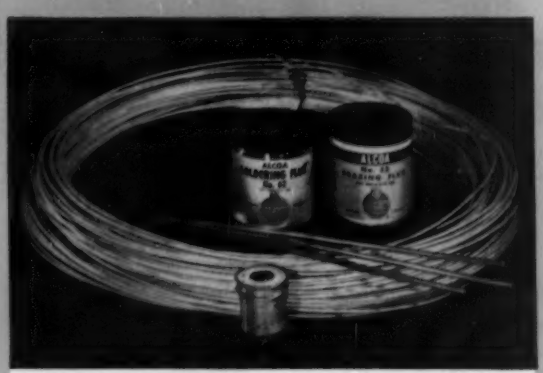
SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



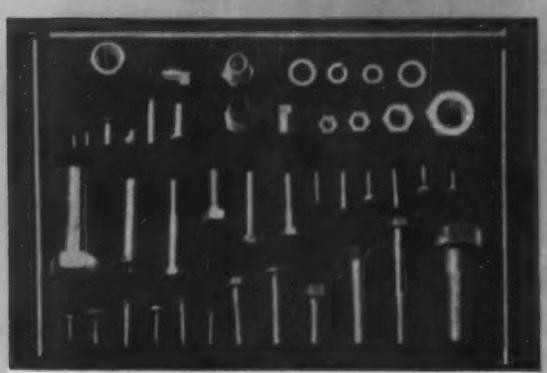
BAR STOCK: Square, hexagonal and rectangular in all commercial alloys. Rolled and cold finished to final dimensions for superior tolerance and finish.



SCREW MACHINE STOCK: Available in 2011-T3 (formerly 11S-T3), the free-machining alloy, and 2017-T4 (formerly 17S-T4), a higher strength alloy, plus 2024, 6061 and 7075 (formerly 24S, 61S and 75S).



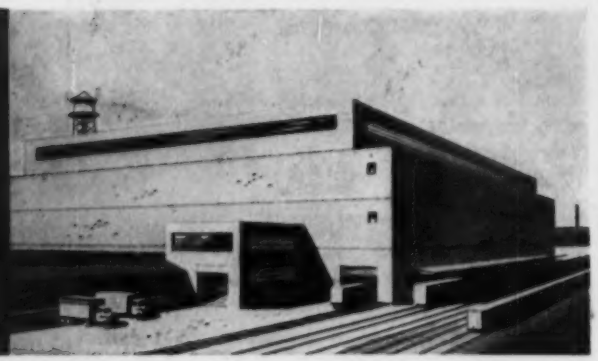
WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.



FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

Your **Alcoa** Distributor **has** **Alcoa** Standard Warehouse items **in stock**

Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.



LOOK FOR HIS NAME HERE:

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Whitehead Metal Products Co., Inc.
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Detroit
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Steel Sales Company of Michigan
MINNESOTA
Minneapolis
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TWO NEW "HOW-TO-DO-IT" FILMS

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Your local Alcoa sales office is a ready source for counsel on special applications of aluminum. You'll find the number in the yellow pages of your classified telephone directory. Or write: ALUMINUM COMPANY OF AMERICA, 875-A Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA **ALUMINUM**

ALUMINUM COMPANY OF AMERICA

famous for over

50 years-

fine saw steels

by JESSOP

The name Jessop has been synonymous with fine quality steels for 170 years. Jessop metallurgists and production men pioneered many "firsts" in the specialty steel field. For instance, 53 years ago Jessop became the first producer of quality saw steels in the United States. Today, Jessop is making further strides in this field. It is one of very few domestic sources for periphery-rolled saw steel circles and ground and tempered steels for the manufacture of saws. There are several reasons for the consistent high quality of Jessop's saw steels. First of all, Jessop rigidly controls its melting formulas and pours ingots small enough for cross rolling. This assures a fine, uniform grain structure so that the stock blanks well, forms well, swages well, and has superior edge-holding properties. Moreover, though Jessop's tradition dates back to 1784, it is today a young, revitalized organization aggressively building new business on value received. The new Jessop team will give you better service and better delivery than you can expect elsewhere. Send in an order and find out how good this saw steel is.

JESSOP

STEEL COMPANY · WASHINGTON, PA.

Q: *Why do the Largest Users of* AMERICAN PHILLIPS *Screws use more of them every year?*

A: *Because the more they use . . . the more they* MULTIPLY PROFITS

Many of the best-known names among U. S. hardgoods manufacturers have used Phillips Recessed-Head Screws ever since American first introduced them to industry.

And for one good business reason: All factors considered, American Phillips Screws cost less than any other fastening method . . . because they're easier to handle, faster to drive, non-skid and slash-proof.

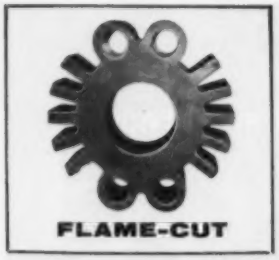
In fact, American Phillips Screws are one of the most effective means of cost-control available to you today. Prove this out for yourself . . . American engineers will help you make a thoroughgoing economy test, right in your own plant.

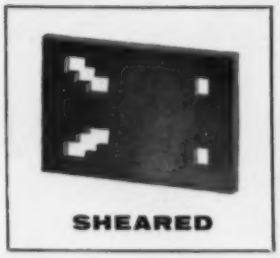
✕ *marks the spot*
. . . the mark of extra quality

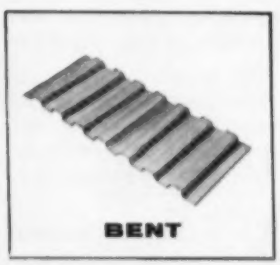
AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

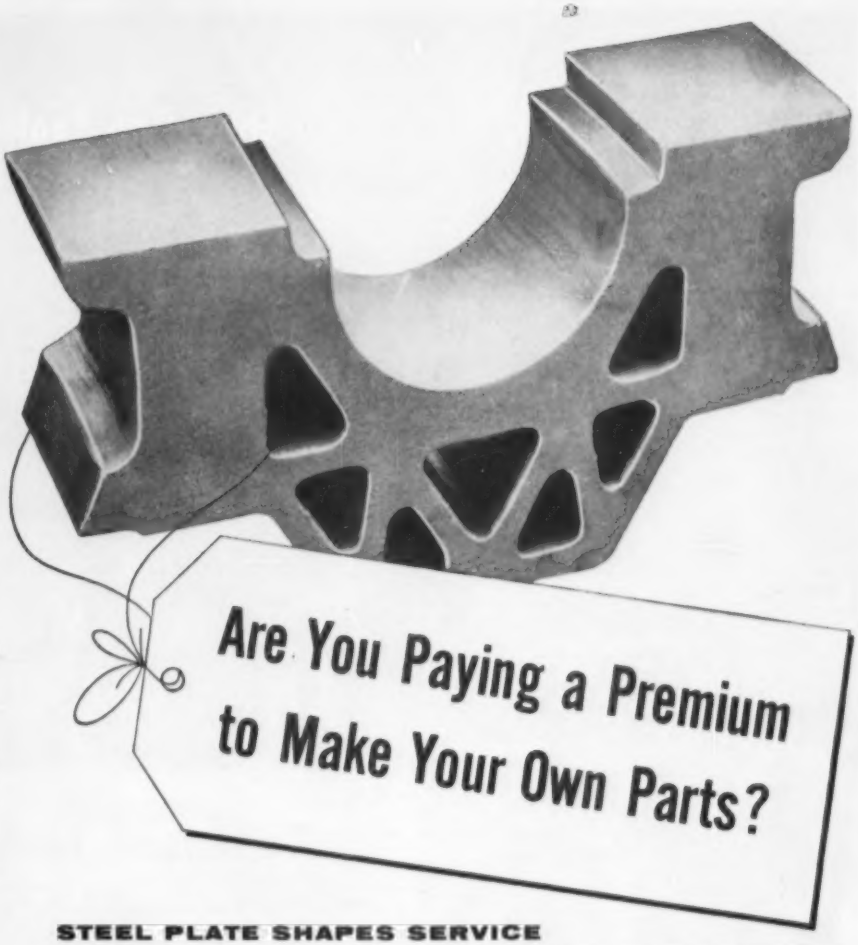
Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan







LUKENS



Are You Paying a Premium to Make Your Own Parts?

STEEL PLATE SHAPES SERVICE CAN HELP YOU SAVE 5% TO 25% ON COMPONENTS

You can cut production costs—save from 5% to 25% on components—by using By-Products Steel Co.'s Steel Plate Shapes Service to pre-form your parts.

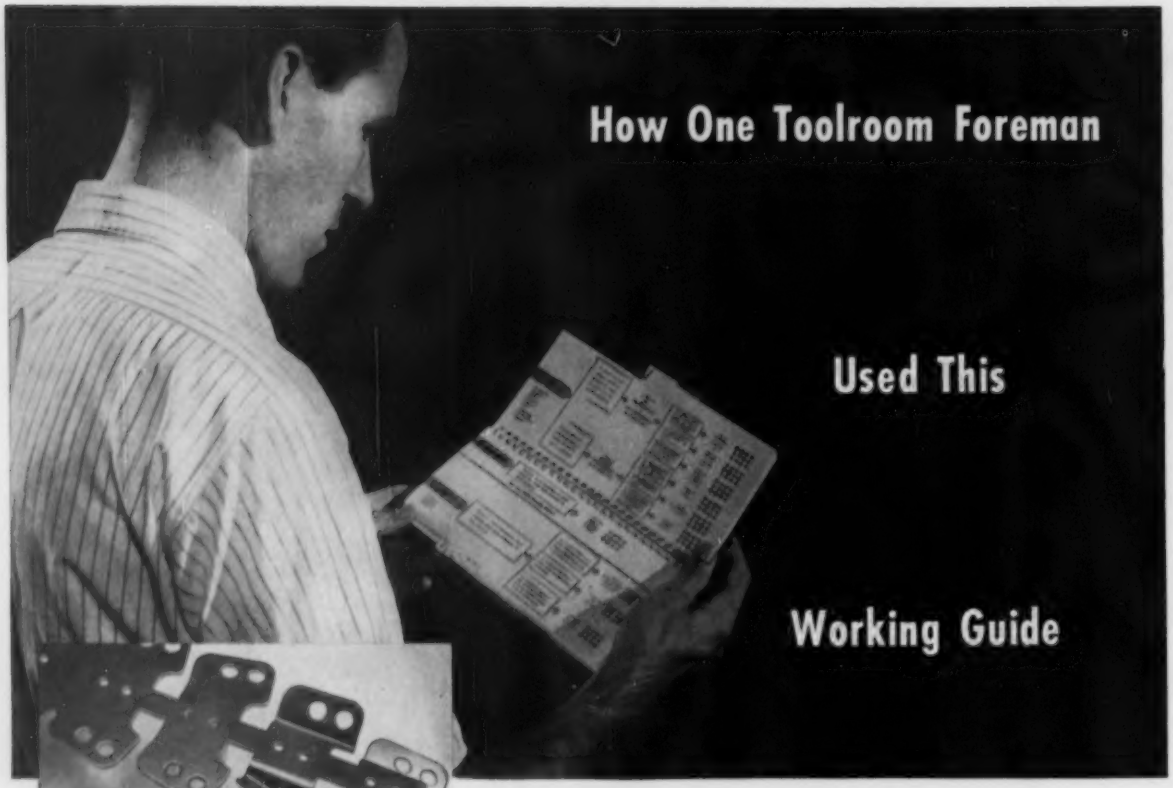
With this Service you can reduce fit-up and finishing costs, eliminate one or more production steps, cut scrap losses and extra freight and handling charges. Operations are speeded by freeing men and machines for other work, and costly plate inventories are reduced.

By-Products has over 150 major machines and a large stock of standard dies of all types available. Work can be done to close tolerances directly from blueprints and may be ordered as formed, or rough- or finish-machined. Shapes of rolled steel plate give you strength, dependability and weight reduction, offer greater possibilities for design freedom.

By-Products can work from plates up to 195" wide or 25" thick in whatever qualities your product requires. Direct access to facilities of the world's leading specialty plate producer speeds production, permits great flexibility in forming and heat treating. To find out more about this unique Service, write on your company letterhead for Bulletin 712. Address: By-Products Steel Company, 741 Strode Avenue, Coatesville, Pennsylvania.

BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company



Job: Punch that blanks stampings from SAE 1010 strip, .062" thick.

Problem: The punch is so unbalanced in design that safety in hardening is vital. Also, the punch is shear fitted to the die, and hardening accuracy is necessary to avoid expensive adjustments after heat treating. Other die steels were tried, but they either broke or changed size too much.

Solution: At this point the Toolroom Foreman called in Carpenter and started to become more familiar with the Matched Tool and Die Steel Manual. The Manual pointed to Carpenter *Vega* (Air-Tough) Die Steel for the punch. Now they're coming through right on the nose. Moreover, production between grinds has jumped from about 10,000 to 50,000 stampings. And the Foreman says that from here on, all his tools and dies will be made from Carpenter Matched Tool and Die Steels. (Write for a more detailed Field Report on this job.)

. . . To Increase Tooling Productivity

This is for the man responsible for tools and dies who looks at a diemaking job with these thoughts:

"How can I make it *easier?*"

"How can I avoid costly *heat treating hazards?*"

"What can I do to *improve the job?*"

If you're that man, Carpenter wants to help. We offer you plain, *practical* help based on almost 70 years' experience working with other men who feel like you do.

How does it pay off? Look at a typical example shown to the left! And your Carpenter representative can show you many more Field Reports of other interesting jobs.

Much of this help is packed into a 189-page working guide . . . Carpenter's "Matched Tool and Die Steel Manual". And that's only part of the program . . . a program backed by *dependable* die steels developed in Carpenter Research Laboratories with a long record of pioneering in new and improved steels.

We're ready to work with you, now. A call to your nearest Carpenter Mill-Branch Warehouse, Office or Distributor will tell us you are, too. THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

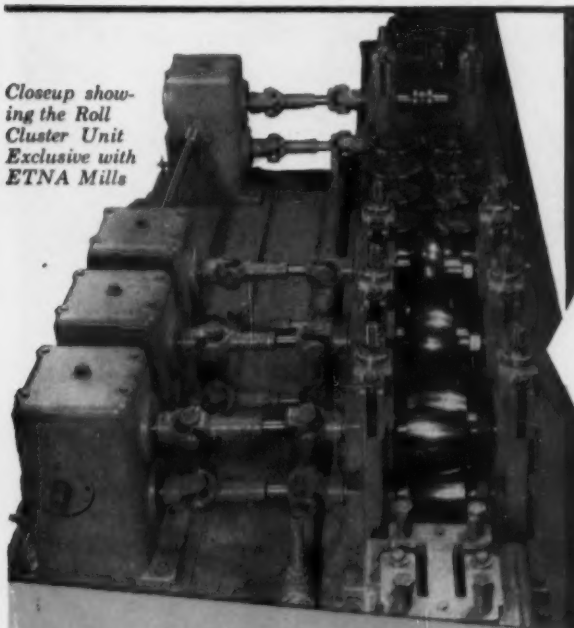
Carpenter STEEL

Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

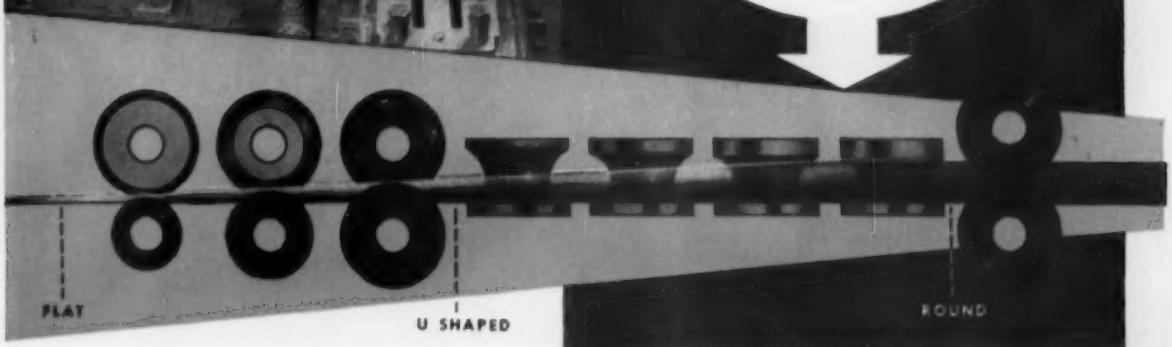
LEADING THE INDUSTRY IN DESIGN...



Closeup showing the Roll Cluster Unit Exclusive with ETNA Mills

NO MARKING . . . NO SCRATCHING
NO UPSET EDGES . . .

THE *Etna* METHOD
FOR SMOOTH, WELL FORMED STEEL TUBING



Exclusive with Etna is the cluster unit. This unit progressively rolls the tube into shape without excessive stretching of the edges, thereby eliminating the "buckling" experienced with ordinary tube mills. Etna machines are not forming mills, they are designed for one purpose only . . . to make clear, well formed carbon and stainless steel tubing with no marking, no scratching, no upset edges. Write for complete details.

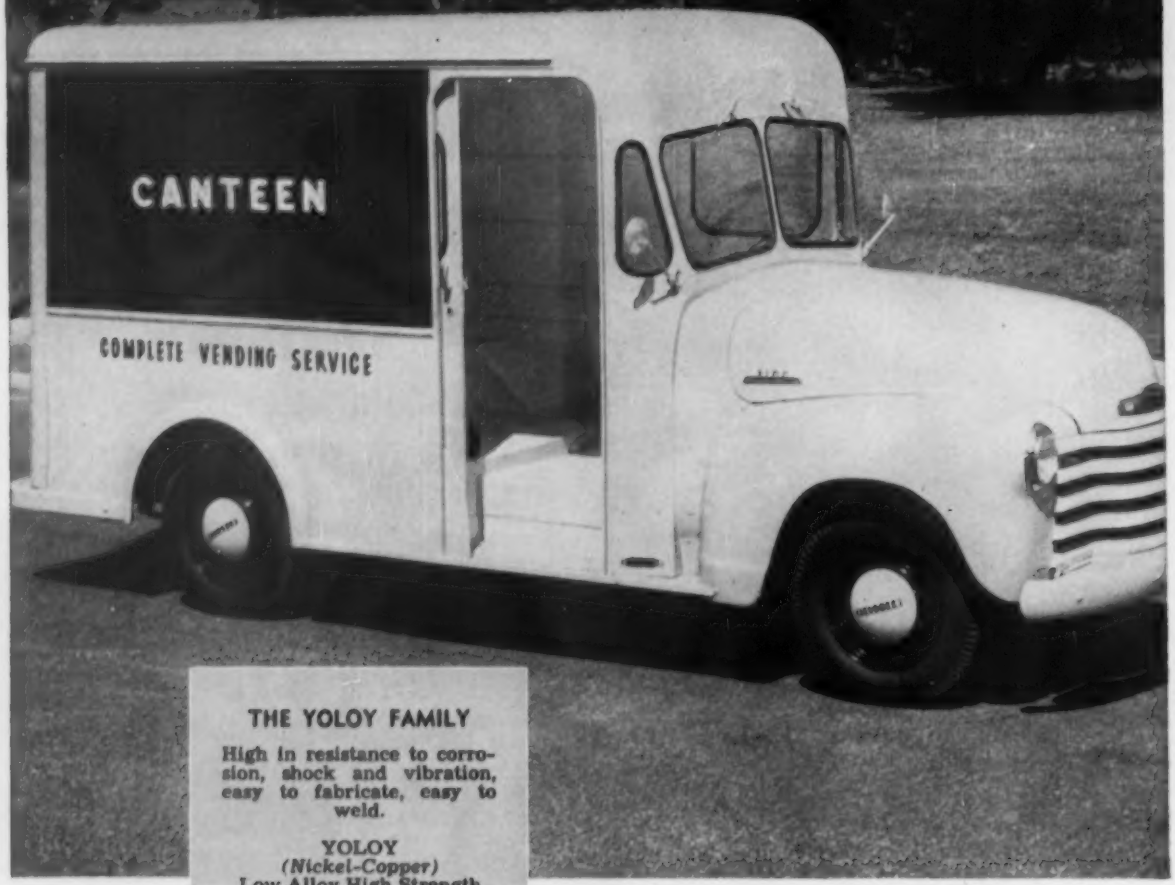
The ETNA 4KU Mill

Abbey ETNA Company

3420 MAPLEWOOD AVE., TOLEDO 10, OHIO

"Yoloy E sheets - ideal for truck bodies..."

says Boyertown Auto Body Works of Boyertown, Pennsylvania



THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

Body Model S-7, with load capacity of 187 cu. ft. Boyertown Auto Body Works, Boyertown, Pa.

YOLOY IS AVAILABLE in sheets, plates, strip, pipe, mechanical tubing, bars, shapes and cold finished bars.

Boyertown truck bodies, such as Model S-7 shown above, are serviceable for many EXTRA YEARS, because they are fabricated from Yoloy "E" sheets.

Due to its nickel-chrome-copper content, this tough corrosion-resistant, low-alloy high strength steel reduces dead weight, resists corrosion and lengthens body life. Yoloy "E" is also outstanding for its resistance to vibration and shock—even at the lowest outdoor temperatures.

For types of Yoloy available for prompt delivery, phone our nearest District Sales Office.

Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Dragonfly
ANAX JUNIUS

Lightweight

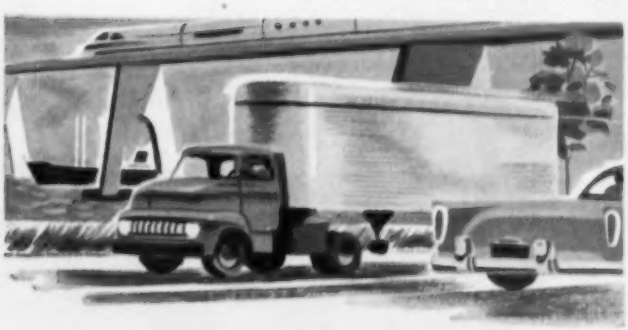
In the world of insects, the Dragonfly (also known as the "devil's darning needle") ranks high for lightweight insofar as size is concerned. It is one of the most active members of the insect kingdom.

This creature can remain almost constantly in the air, flashing forward and backward. It can remain poised in a fixed position and then dart faster than the eye can follow—only to reappear in almost the same spot.

In the world of materials, aluminum is one of the lightest of metals. Aluminum weighs one-quarter to one-third as much as other commercial metals. With proper design, aluminum can cumulate direct weight savings and multiply them many times—as much as ten times in the structure of aircraft. Compared on an equal weight basis with traditional metals, aluminum can give several times the number of parts per pound.

Because rotating and reciprocating parts made of aluminum are light in weight, their inertia forces are low; braking and accelerating forces also are less than with heavier materials.

Aluminium Limited Sales, Inc. is distributor in the United States for aluminum from Canada. Why not investigate making your products of aluminum?



Lightweight

In the construction of Automobiles, Trucks and Trailers, Ships, Trains, Drums and Barrels, aluminum is put to more new uses than any other metal. Lightweight aluminum means extra payloads and more economical operation.

Aluminum *from* Canada

Aluminium Limited Sales, INC.

630 FIFTH AVENUE • NEW YORK 20, N. Y.

CLEVELAND • CHICAGO • DETROIT • LOS ANGELES • BUENOS AIRES • SÃO PAULO

La Salle MANUFACTURES QUALITY

COLD FINISHED STEEL BARS...

ROUNDS, FLATS, SQUARES, HEXAGONS, SPECIAL SHAPES LaSalle offers a complete range of cold-finished steel bars in popular sizes, shapes, and lengths. Also, special shapes to order.

COLD-DRAWN—TURNED AND POLISHED —GROUND AND POLISHED Modern drawing, turning, and grinding equipment, and skilled workmanship insure quality steel bars in standard grades.

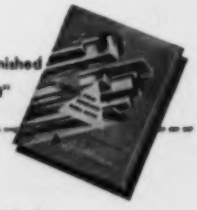
CARBON AND ALLOY STEELS LaSalle manufactures quality cold-finished bars in AISI and SAE carbon and alloy steel grades.

FREE-MACHINING STEELS LaSalle *specializes* in free-machining steels for economical production of your parts ... Bessemer, open-hearth, and several types of leaded steels.

FURNACE-TREATED STEELS LaSalle's furnace treatment develops elevated physical properties through quenching and tempering, and stress relieving. Careful annealing improves machinability.

SPECIAL STEELS Aggressive engineering research makes LaSalle a leader in specialty steels . . . with such developments as STRESSPROOF, LA-LED, and Super LA-LED.

Send for "The Story of Cold-Finished Steel Bars . . . from Ore to Finished Product"



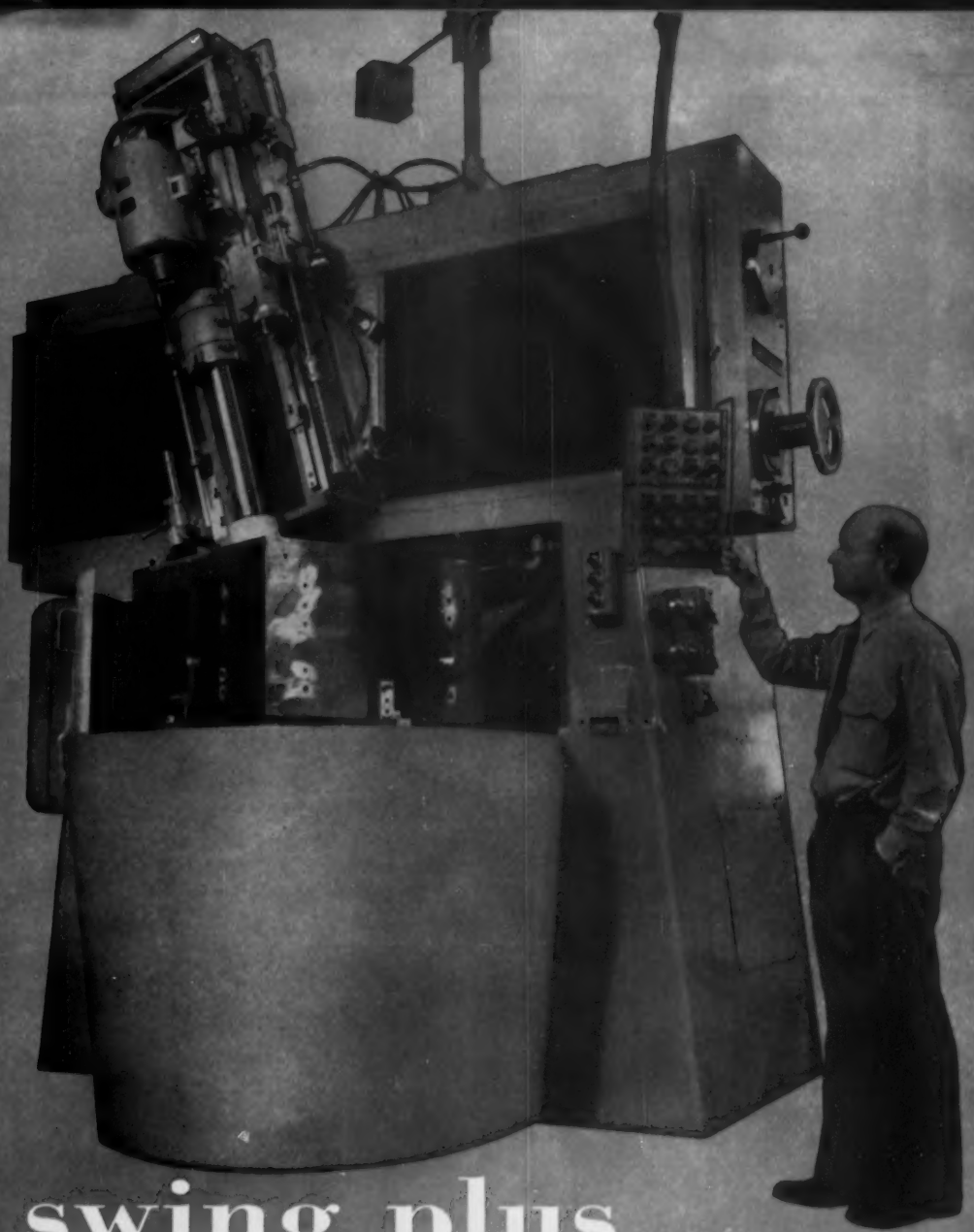
La Salle STEEL CO.

Manufacturers of the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

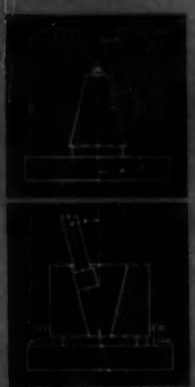
LA SALLE STEEL COMPANY
1436 150th Street
Hammond, Indiana

Please send me "The Story of Cold-Finished Steel Bars . . . from Ore to Finished Product"

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____



52″ swing plus...



. . . plus 27½″ grinding head stroke, 24¾″ clearance over face plate, 42″ diameter face plate—on Springfield's new Vertical Universal Grinder. Work piece on the grinder here is a washing machine agitator mold, 43″ corner to corner. One angle setting of the head ground both male and female taper for a perfect fit. Hand-lapping them would take a week. Springfield's time: 4½ hours.

Other Springfield Vertical Universal Grinders—swings 21″ and 30″. Lathes—toolroom, engine, contouring, reproducing—14″ to 32″. Write for the name of your nearest Springfield dealer.

THE SPRINGFIELD MACHINE TOOL CO., SPRINGFIELD, OHIO

SPRINGFIELD

You can spot productive hands by the
Behr-Manning abrasives
boost production
all along the line...

company they keep...

Cleaning-up the tough little jobs with Behr-Manning special abrasive tools

With METALITE Abrasive Specialties on hand, it's a cinch to produce fast, easy finishes on hard-to-get-at surfaces. These Specialties, teamed with today's high-speed power tools, answer industry's demand for a faster rate of production. They're available in a wide range of sizes, shapes and grits. Try them on your problem jobs.

Write for the Production Digest Bulletin. Contains detailed data on coated abrasives grinding and polishing techniques. Address Behr-Manning, Troy, N. Y., Dept. IA-1.

In Canada: Behr-Manning (Canada) Ltd., Brantford
For Export: Norton Behr-Manning Overseas Inc., New Rochelle, N. Y., U. S. A.

Metalite Cloth abrasive pencils make easy work of deburring or radiusing.

Flexible Metalite Spiracords save time in deburring inside radii.

Moulded Metalite Mushroom Discs and convex rubber pad remove tool marks rapidly.

G-1

BEHR-MANNING® division of NORTON Company

▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES

Last lap *in fabricating* Monel *into one of the lightest, strongest, longest-lived pickling hooks on the market*

You can see for yourself how this hook is made . . . how thin, light-weight Monel® mill forms can be fabricated into any shape a practical design may require.

You can see, too, the strength of its construction. Monel hooks like this handle big 3-4000 lb. pay loads of coiled wire with strength to spare.

And if you are at all familiar with the history of Monel in pickling service, it's easy to foresee that this hook will have a long life.

In Monel, excellent physical strength and toughness are combined with unusual resistance to corrosion by the common types of pickling solutions. Because of this combination, Monel pickling equipment gives many years of service under even the most severe conditions.

Then after long service, Monel equipment is as easy to repair and recondition as it was to fabricate in the first place.

So look to Monel for minimum deadweight, maximum life pickling equipment. And look to experienced designers and fabricators like Youngstown Welding and Engineering Company to help you realize to the fullest these values of Monel in pickling service.

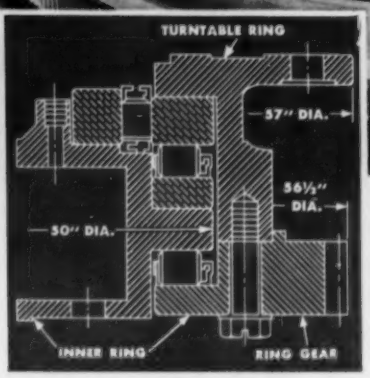
For information on other pickling uses of Monel, write for the Inco booklet, "5-Way Savings in Pickling."

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

extra life
extra capacity
extra safety

INCO TRADE MARK

Monel
Pickling Equipment



Switch to SSW forged rings in bearing assembly adds to "ultra-accuracy" of naval gun director

Three forged rings which are the major parts of this bearing assembly for a naval gun director contribute to required "ultra-accuracy." By switching to Standard Steel forgings in two of these rings General Electric Company, Pittsfield, Mass., gets *all* these benefits.

1. The 57-in. O.D. turntable forged ring (formerly a casting), improves uniformity and stability of the metal, its machinability, and reduces required machining.
2. Proper heat treatment and precision machining give extreme smooth rotation on the roller bearings and accurate positioning without backlash.
3. Production has been simplified and speeded up and fabrication costs reduced.
4. The stationary 50-in. O.D. inner ring eliminated a weldment consisting of five rings cut from steel plate.
5. These rings cost less than cast rings in the quantities needed.

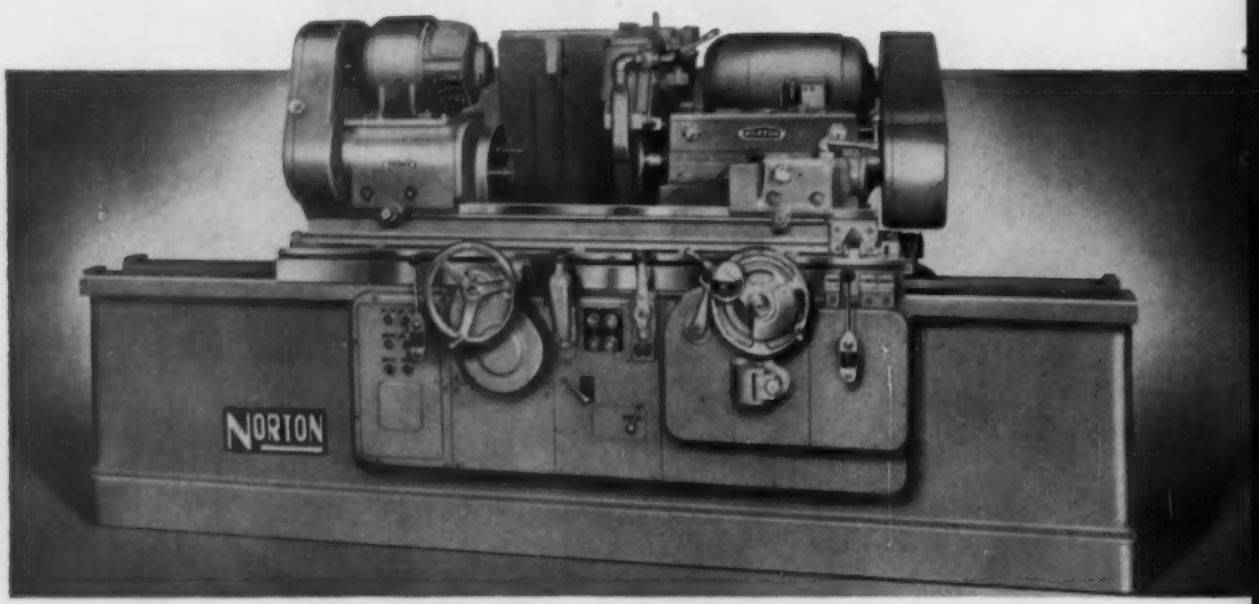
You, like General Electric, will benefit by using Standard Steel Works forgings. It'll be to your advantage to check how profitably SSW forged rings can replace weldments and castings. Why not write today for more information? Please address Dept. 8716, Standard Steel Works Division, Baldwin-Lima-Hamilton Corp., Burnham, Pennsylvania.

BALDWIN · BLH · LIMA-HAMILTON

Standard Steel Works Division
Burnham (Mifflin County), Pa.

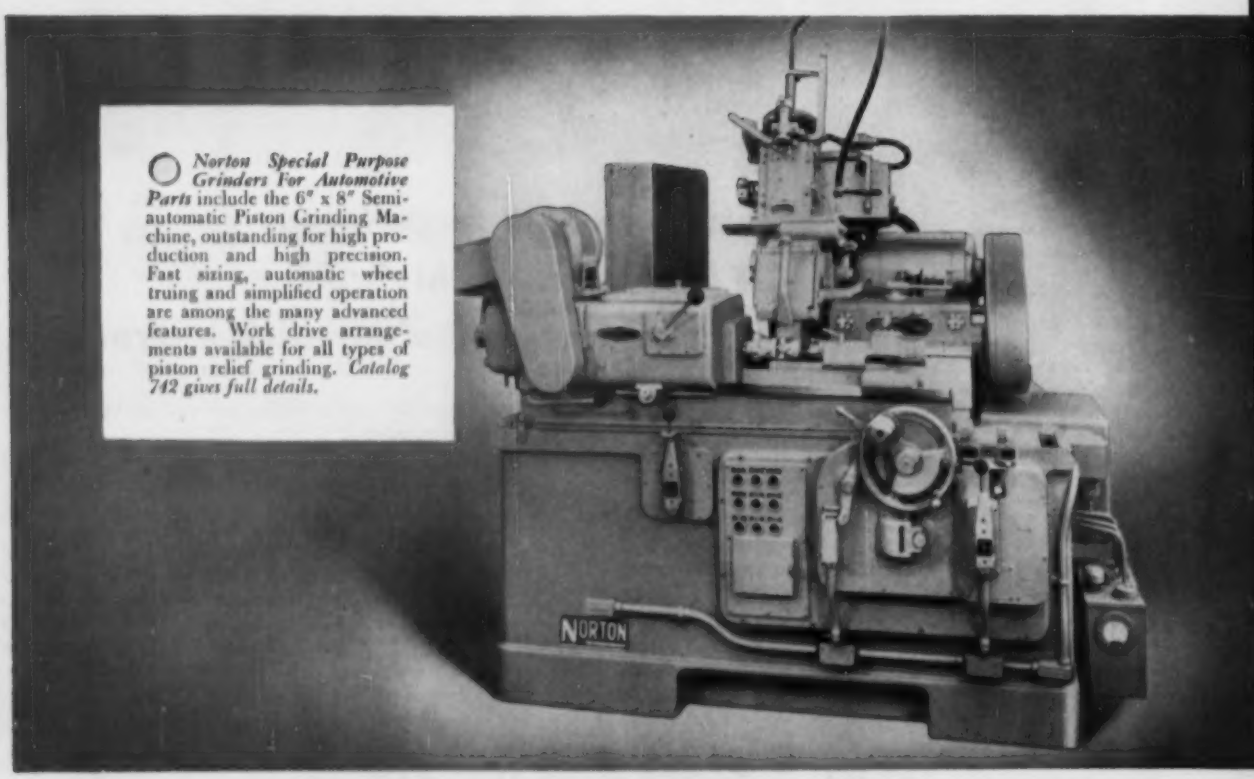
BALDWIN-LIMA-HAMILTON
General Offices: Philadelphia 42, Pa. • Offices in Principal Cities

6 from the world's most



○ *Norton General Purpose Production Type Cylindrical Grinders.* The 10″ x 36″ Type GTU Semi-automatic, a top performer among grinding machines of this type, offers a unique combination of speed, accuracy, flexibility and sturdiness. One-lever control of the automatic grinding cycle reduces operator's duties to loading and unloading. Production line and job shop users report Norton 10″ GTU's have doubled production, replaced several machines, eliminated extra operations. *Write for Catalog 1787.*

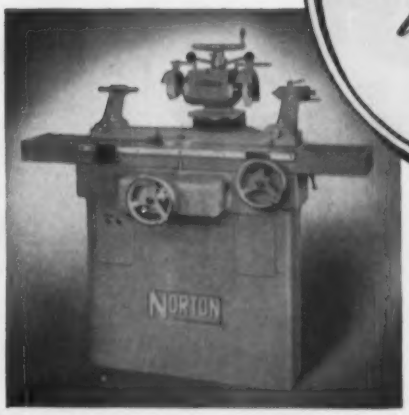
○ *Norton Special Purpose Grinders For Automotive Parts* include the 6″ x 8″ Semi-automatic Piston Grinding Machine, outstanding for high production and high precision. Fast sizing, automatic wheel truing and simplified operation are among the many advanced features. Work drive arrangements available for all types of piston relief grinding. *Catalog 742 gives full details.*



complete line of

money-saving grinders and lappers

○ *Norton Surface Grinders* are well represented by this 8″ x 24″ Hydraulic Grinder. Designed with both hand and power table traverse and cross feed, it produces plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance times low. Extra equipment, such as magnetic chucks, wet grinding attachment and individual dust exhaust system meet all operating conditions. *Write for Catalog 190.*



○ *Norton Tool Room Cutter Grinders.* The No. 20 Cutter and Tool Grinder is the most versatile machine in its class. The wheel head tilts up to 15° above or below horizontal, and may be swivelled through 360° — simplifying such jobs as grinding taper reamers, step counterbores, form tools and milling cutters. Other pace-setting advantages include long table traverse and wheel slide travel . . . integral motor spindle . . . wheel slide graduated dials readable from any angle. No other cutter and tool grinder does so many jobs so fast, so easily. *Catalog 189 tells you why.*

○ *Norton Lapping Machines.* The Type 16FC Vertical Lapper brings you outstanding production capacity for such work as diesel injector parts, plug gages, size blocks, sides of small bearing races, pump gears and plates and many other parts. Laps flat work up to 3″ x 5″, and cylindrical work up to 3″ diameter, producing a high degree of accuracy and finish. *Catalog 212 gives you details.*

Only Norton offers you such long experience in both grinding machines and wheels to help you produce more at lower cost.

The six machines shown here are typical products of that experience — bringing you ahead-of-the-parade design that speeds production and adds maximum product-value on every job they do for you.

But remember — these six advanced machines represent only a small fraction of the world's broadest line. Besides many models of cylindrical, surface, crankshaft and camshaft grinding machines, Norton produces a wide range of lapping machines, tool room grinders and special types for grinding pistons, valves, jet parts, etc.

A new illustrated folder #1843 lists the entire Norton line of grinding and lapping machines and tells you how to get all the facts on each unit. For your copy, write to NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

○ *Norton 10″ Universal Grinders.* The 10″ x 20″ Universal Grinder has the flexibility to handle an almost endless variety of jobs. Compound swivel arrangement of wheel head enables you to make separate angular settings of wheel and feed. External, internal, face or angular wheel slide operations are easy. Chuck may be mounted on one end of work head spindle, ready for use by turning head 180°. *Write for Catalog 170.*

To Economize, Modernize With NEW

NORTON

GRINDERS and LAPPERS

Making better products . . . to make other products better

District Sales Offices: Worcester • Hartford • New York
Cleveland • Chicago • Detroit

SAVE
MACHINING COSTS
—WITH NEW DISSTON
HOT ROLLED STAINLESS
STEEL SHAPES

Here's big news to *Stainless* users—especially those in the jet engine and automotive fields. From Disston—leaders for 100 years in the rolling of special shapes—comes a new specialized skill to help you solve rising costs of metal shaping. After years of experimentation and over a year of volume deliveries, Disston is ready to supply complex *stainless* steel shapes to *your* specifications.

Why not discuss your problem with Disston. Find out just how much you can save with this modern production technique. Write or call: Henry Disston and Sons, Inc., Steel Sales Division, 119 Tacony, Philadelphia 35, Pa., U.S.A. Disston makes stainless, carbon, alloy and tool steel in either standard or special shapes.

DISSTON
HAS THE EDGE®

in special purpose steels and special steel shapes.

B&W ALLMUL *with electrically fused grain for . . .*

Stamina in Tough Service

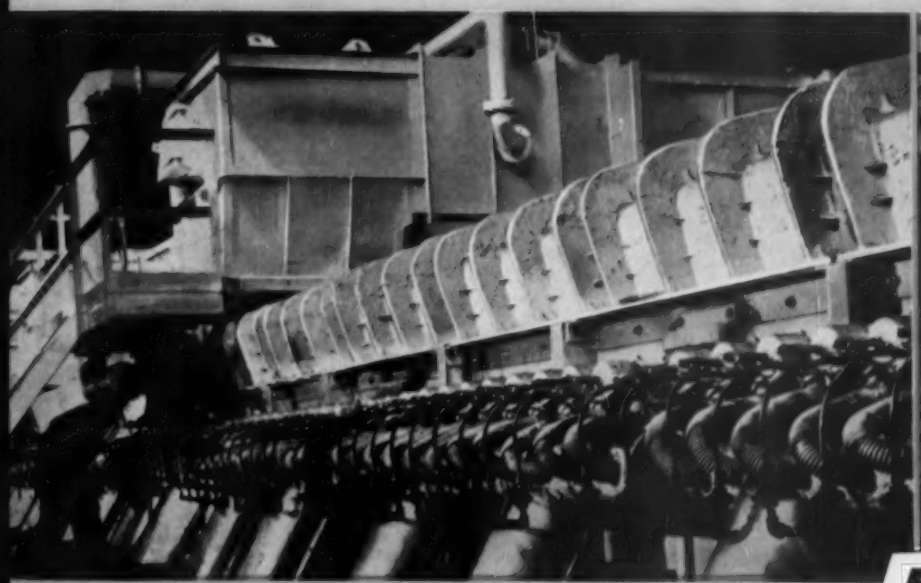
B&W Allmuls are used in many different kinds of heavy-duty furnaces. This example happens to be a butt weld furnace for continuous high speed welding of pipe. In the hottest areas (3000F or more), a mullite-*type* brick lasted only six weeks. Cause of failure: spalling, aggravated by metal penetration.

At the same locations, B&W Allmuls, made of electrically melted grain, lasted a full year—or more than eight times as long. It's by no means strange that the furnace operator now uses Allmuls for bungs, burner blocks, uptake arches and sidewalls, crossovers and furnace sidewalls.

Allmuls are volume produced by a highly efficient process. That's how you get—at relatively low first cost—top quality, fused-mullite brick with these properties: high hot load strength, high resistance to spalling, good volume stability, and a melting point of 3335F.

Whatever you're processing—steel or other metals, ceramics or chemicals—if your furnace demands a lining that can really take punishment, it will pay you to get complete facts on B&W Allmul. May we send you additional information?

A Close-up view of butt weld furnace where electrically-fused B&W Allmul far outlasted mullite-type brick. **B** Another view of butt weld furnace — charging end.



B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
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Large MOTORS

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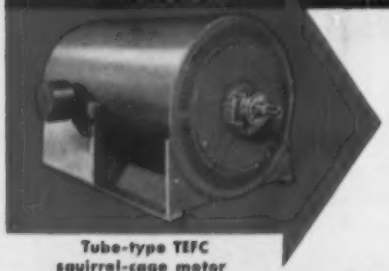
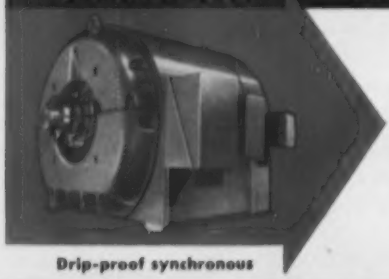
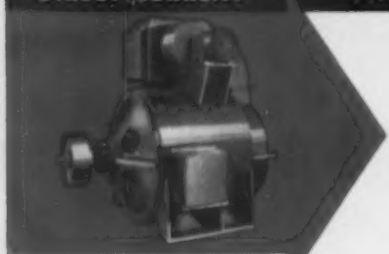
INDUCTION	Performance Characteristics	Protection	Applications
 Tube-type TEFC squirrel-cage motor	Single or multi-speed. Wound-rotor design for variable speed operation. Available with low starting current, high starting torque and other special characteristics.	Open; drip-proof; splash-proof or weather-protected; enclosed, self or forced-ventilated; totally-enclosed, fan-cooled; totally-enclosed, water-cooled; explosion-proof.	Fans, blowers, machine tools, pumps, material handling and auxiliary equipment, compressors, m-g sets, general purpose use. Wound-rotor for variable speed where speed range is not too great.

SYNCHRONOUS	Performance Characteristics	Protection	Applications
 Drip-proof synchronous	Constant speed under all load conditions. Excellent for low speed. High efficiency under all loads. Unity or leading power factor.	Open; drip-proof; splash-proof or weather-protected; enclosed, self or forced-ventilated; totally-enclosed, fan-cooled; totally-enclosed, water-cooled; explosion-proof.	Can be used for almost any type of constant speed drive. Frequently used where power factor correction is necessary.

DIRECT-CURRENT	Performance Characteristics	Protection	Applications
 Force-ventilated dc motor	Stepped or stepless wide range speed variation. Reversing or non-reversing. Dynamic or regenerative braking.	Open; protected; drip-proof; splash-proof; forced-ventilated from attached or separate blower; enclosed, water-cooled.	Rolling mills, processing lines, wire mills, machine tools, and other machines requiring wide range of speed adjustment with constant and variable torque and horsepower.

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ALLIS-CHALMERS

The Iron Age Newsfront

Automation: New Jobs, Skills

Automakers have launched a counter offensive on behalf of automation. Top industry men are using every opportunity to show how technological progress contributes to the standard of living, creates new jobs, demands new skills, and results in better and safer working conditions.

Research: Plastic Compressor Rotor Blades

Fiber glass reinforced plastic compressor rotor blades have been run on test for 100 hours at 300°F with no signs of erosion or impending failure. Tests also indicated practically no creep and excellent impact and damping properties are available.

Inland Water Traffic Shows Gain

Freight tonnages moved along inland waterways show sharp gains in recent statistics on U. S. waterborne commerce. Inland water traffic last year hit a record 200 billion ton-miles, some 18 billion ton-miles over the previous high set in 1951.

Coating Protects Copper, Brass, Silver

A water-displacing and oxide inhibiting coating for copper, brass and silver is reported to withstand 95 pct humidity at 40°C for 100 hours. Used on many types of parts, the transparent, dry film does not have to be removed before soldering or for further processing.

Prepolished Hot Rolled Steel

A flat polishing process used to prepolish hot rolled steel offers new economies to stamping producers. Total cost to the user of the hot rolled prepolished material is reported under that of cold rolled steel. One typical application is auto bumpers.

Plant Talks To Itself Faster

A facsimile communication system that transmits photographs, letters, drawings, voice or penciled notes has been installed at Chrysler Corp. The transmitter has been installed in the central records department where it can send any document from central files to the administration building in a matter of minutes.

Stainless: Controlled Temperature Rolling

Controlled temperature rolling of stainless, on a laboratory scale, indicates great possibilities in controlling orientation of steel. By a slight temperature rise, random orientation can be attained—ideal for deep drawing. Strength can also be increased, opening way to weight savings.

Tank Designed for Atomic Blast

Elevated tank structures capable of withstanding an atomic blast equal to 20,000 tons of TNT at a distance of one-half mile can now be built. The new tank design has been especially developed to resist the terrific pressures set up by an atomic explosion.

Test Stronger Gas Well Casing

A new high-strength carbon-molybdenum gas well casing is undergoing field tests. Minimum yield strength is 150,000 lb as compared with present high of 110,000 lb. Higher strength is needed to withstand well gas pressures as high as 8000 to 9000 psi.

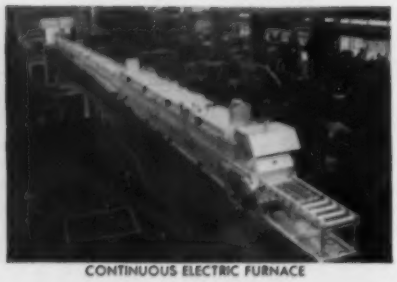
Bottom Pouring May Soon Get Trial

Increased interest in bottom poured ingots is more than tentative. At least one steel company is exploring the possibilities. Reason: Bottom pouring may help reduce pipe and porosity.

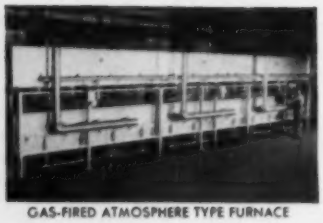
Enameling Iron: Demand High and Steady

Current rush back to enameling iron by the appliance industry has put the commodity into a demand category somewhat above going demand for cold rolled sheet. The demand appears long range and some companies are seriously considering expansion of present capacity.

AUTOMATIC ROLLER GRID FURNACE



CONTINUOUS ELECTRIC FURNACE

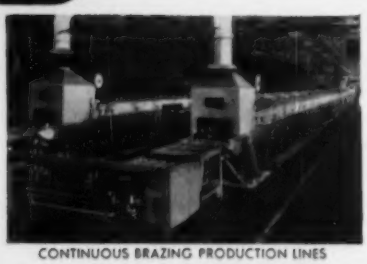


GAS-FIRED ATMOSPHERE TYPE FURNACE

BIG ONES

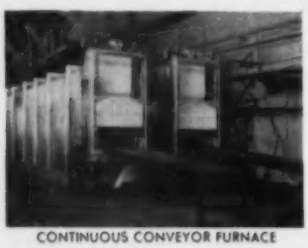
AUTOMATIC ROTARY HEARTH FURNACE

ALUMINUM BILLET HEATER

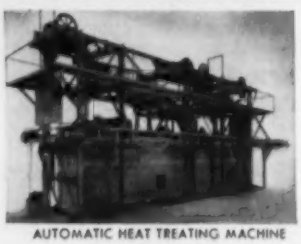


CONTINUOUS BRAZING PRODUCTION LINES

CONTINUOUS ROTARY RETORT FURNACE



CONTINUOUS CONVEYOR FURNACE



AUTOMATIC HEAT TREATING MACHINE

CONTINUOUS VITREOUS ENAMELING LINE

. . . all field-erected by Lindberg

Maybe you haven't heard the news. Lindberg is now set up to field-erect any type of industrial heating or processing installation. Here are just a few of the large field-erected installations already put up by Lindberg. More are being built right now.

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Auto Settlement May Set Pace for Steel

Since auto industry labor contracts end one month earlier than steel's, UAW agreement could set floor or ceiling for steelworkers . . . Auto workers will drive for GAW, steel won't—By *J. B. Delaney*.

◆ STEEL WAGE negotiations may be settled in Detroit this year.

Dave McDonald and his United Steelworkers may find themselves in the position of having to accept a wage pattern established by Walter Reuther's United Autoworkers, whose contracts with major car producers expire one month before major steel agreements.

This would be something of a twist that may or may not be to McDonald's liking. But a wage settlement in automotive certainly would establish a floor and perhaps a ceiling for the steel workers, who are free to reopen contracts on wages only. If steel wage agreement is not reached by June 30, the USW may strike.

If there is a strike or an extension of contracts in automotive, the USW could again be the pacesetters on wages. McDonald's relations with the steel industry are good. The union and the companies have come to recognize each other's problems. The philosophy among top industry negotiators is that steelworkers are entitled to a fair shake on wages in relation to cost of living, earnings of workers in other industries, and the ability of the industry to absorb or pass along higher wage costs.

So there's a good chance that steel and the USW could come to terms quickly and perhaps beat the autoworkers to the punch on wages.

GAW Could Mean Auto Strike

Apparently McDonald has no thought of torturing the language of present contracts to ring in the issue of the guaranteed wage. He said as much in Cleveland last week with the remark that the guaranteed wage could not come up in steel negotiations this year.

While McDonald and his predecessor, the late Philip Murray, have listed the guaranteed wage in steel as a major union objective, Mr. McDonald seems content to let Reuther battle this one out with the auto industry if he has a mind to. Reuther lists GAW as a top objective this year and it could be the issue to lead to a strike against one or more of the car producers.

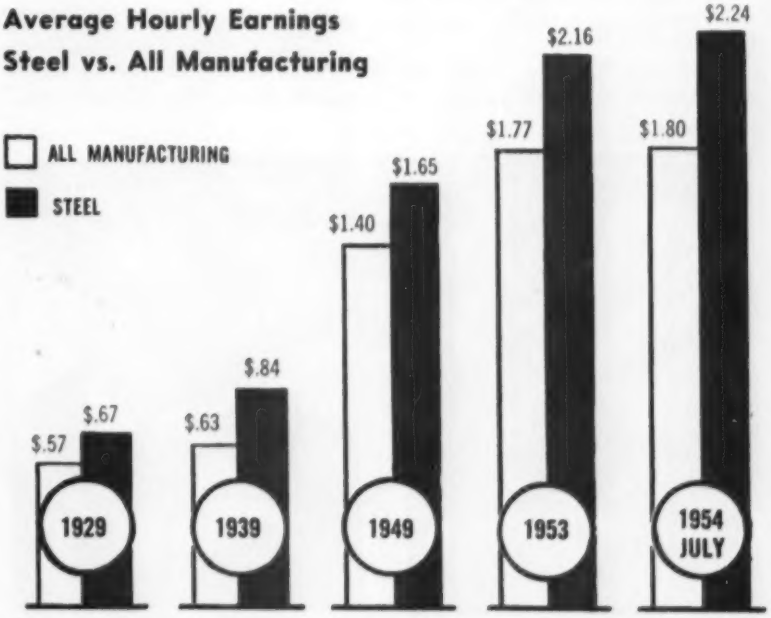
Some sources in steel believe that McDonald may have changed his mind about a guaranteed wage for his members. They expect him to continue to beat the drums but feel that privately he considers improvements in state unemployment compensation benefits as a more logical approach to the problem.

Steel Up $4 to $5

It's probably anybody's guess as to what the steel union would settle for in the way of a wage increase this year. Last year he took 5¢ on wages and a total "package" including pensions and insurance of over 12¢ an hour. In 1953, his first year as head of the union, he won a wage boost of 8½¢.

Despite the possibility of a letdown this spring with or without an automobile strike, the outlook for steel this year is considered good. McDonald and his advisers are as aware of that as any steel

Average Hourly Earnings
Steel vs. All Manufacturing



Average hourly earnings shown here do not include employers' payments for vacations, holidays, pensions, insurance, unemployment compensation and social security. Source: Bureau of Labor Statistics.

company executive. It will be one of the levers he will use in his negotiations.

So unless the outlook changes radically by negotiation time, chances are the wage settlement this year will be 10¢ an hr. It could be less, perhaps a minimum of 8¢. Steel prices would rise between $4 and $5 per ton to compensate.

Auto:

Producers expected to keep output high as strike hedge.

Possibility of intentional overproduction of automobiles as a form of strike hedging has thrown a shadow over the otherwise bright steel demand in Detroit.

To date, there is little evidence that there is any float in the terrific production rates that set individual records every week. Dealer inventory checks do not show any alarming stocks of new cars in dealer hands. By and large, the new 1955 models are going well and four makes, Hudson, Nash, Packard and Kaiser-Willys, are only in the process of entering the market after late introductions.

It is important to point this out because previous market reports have been misinterpreted as indicating there already is an artificial factor in production schedules.

Can't Hold Pace

But if that is so, why are Detroit steel sales offices checking orders for storage or other indications of an artificial demand? Aren't some mills sold out on flat-rolled through the entire second quarter?

The point is that current production rates can't last. And the week that production continues high after demand has fallen off will be the point when the steel market bears enter the picture.

It is a mathematical fact that if current auto production rates continue well into the second quarter, the industry will have produced about 3.3 million cars by the end of May, against an optimistic prediction of an annual market of 5.8 million.

The end of May is also the end of the famous 5-year pacts that the auto industry and the United Automobile Workers have prospered under for the past half decade. Betting in Detroit is two to one that a strike of serious dimensions will result at either Ford or GM, the industry's major producers.

Expect Summer Dip

If one of these giants should be faced with a prolonged shutdown, the others in the industry don't intend to be caught short on cars. Those that are faced with the strike threat want as many cars in storage or in dealer hands as possible in hopes of riding out a shutdown of moderate duration without losing sales.

But the automotive steel market should ease sharply in early summer whether there is a strike or not. Obviously, a strike would put major steel purchasers out of the market entirely to the extent that the slack could not be completely picked up by others.

If present production continues and there is no strike, an overabundance of cars on the market will slow production. Seasonal factors will contribute because the model year will be more than half over by the end of May. Thirty-day inventories could automatically become 60-day inventories and the whole process of inventory control, which Detroit steel salesmen experienced last summer and autumn, could be repeated.

Auto Orders Justified

Such a picture would affect the flat-rolled market more seriously than other products. Cold-finished strip would suffer more than cold-rolled sheet as many customers would return to slit coils.

All this could be unwarranted pessimism, but the possibility should not be overlooked. At the same time, it would be unwise to underestimate the auto industry's strong position. There is no evidence as yet of production padding, but the third quarter will tell the tale.

UAW's Walter Reuther

USW's David McDonald

Who'll carry the labor ball farthest in 1955?

Record Steel Output

Detroit Steel Corp. expects January steel ingot production at its Portsmouth (Ohio) Div. will set a new company record. The mill is scheduled to turn out 67,000 tons this month, topping the previous record of 61,496 tons produced in December, 1947.

Outlook for the entire first quarter is good too. Production during the first 3 months of 1955 is expected to be about 226,000 tons of ingots, three times the amount made in first quarter last year and 30 pct higher than in any quarter in the mill's history.

TITANIUM: Casting Takes A Giant Step

Wisconsin Centrifugal Casting Co. ready to start commercial production of centrifugal cast titanium alloys . . . Will enter market now dominated by forgings . . . Armour Research collaborated—By *K. W. Bennett.*

◆ WITH THE AIRCRAFT industry an eager consumer, titanium castings will take a long forward stride this year.

The initial indication was the announcement recently that Armour Research Foundation, Chicago, and Wisconsin Centrifugal Casting Co., Waukesha, were centrifugally casting commercial titanium alloys in weights of 3.3 to 9 lb, and up to 5 in. diam.

By spring these first indicators will already have been replaced by production castings that will far outstrip the test castings in size, diameter and tensile strength. Though pure titanium castings can give high strength, the need is to produce a titanium commercial alloy casting that will do the job.

Move Into Market

In 2 weeks, Wisconsin Centrifugal will be pouring 14 in. diam titanium alloy rings destined for jet engine application, and the months of March or April will see single castings of 30-35 in. diam and weighing up to 50 lb coming from the firm's spinning molds in production lots.

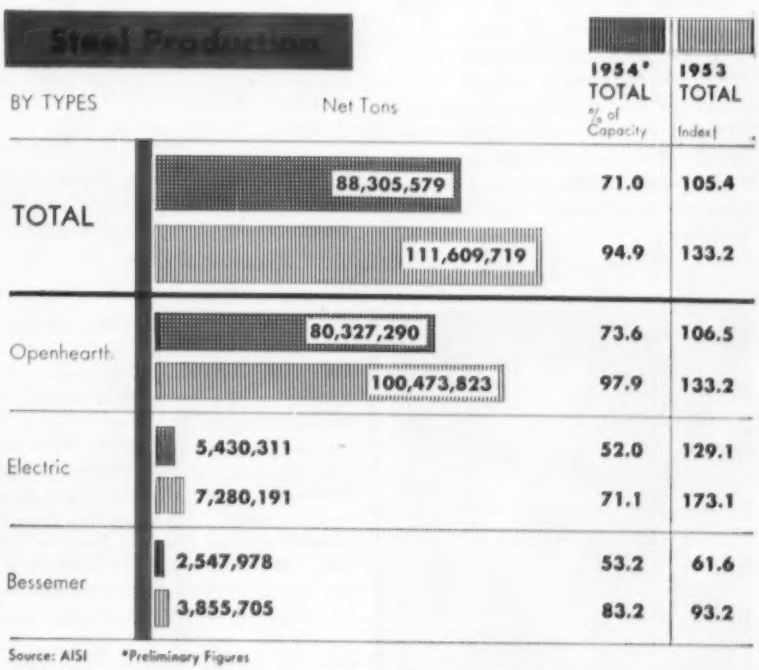
The new research will enable the young (started in 1945) Waukesha firm to move squarely into a market that has been dominated by titanium alloy forgings, and where tensile strength specifications run well over 150,000 psi. With a surface removal of 1/16 in. depth to achieve the surface required by Air Force specifications, Wisconsin Centrifugal believes that it can substitute a 50-55 lb unfinished casting for a part that weighed 200 lb in its "as forged" condition prior to rough and final machining.

At present, test results for the 5 x 5 in. castings produced have run only to 130,900 psi. Both Wisconsin Centrifugal and Armour Research accept it as fact that they'll have exceeded 150,000 psi tensile strength at the conclusion of 3 weeks of heat treatment testing now in progress, and that the figure will have advanced well beyond the necessary 150,000 to 170,000 and even as high as 190,000 psi. The major portion of titanium castings to date, the producers believe, has been in either pure titanium, or when cast in a titanium alloy, only for "as cast" strength.

Cast titanium alloys fulfill a need that jet engine builders feel keenly. One engine may use 80 large diameter rings along its length. In one case, of the total 80 rings, 40 will be centrifugally cast titanium alloy. Actual melt capacity will not be large. A 55 lb heat is melted using an arc in a protective atmosphere and the melt poured into a standard spinning mold, still protected against possible contamination.

Wisconsin Centrifugal has been notable in the past as a bronze casting facility, though always a centrifugal casting plant. With its new titanium pouring project, the firm is moving also into stainless casting.

The Wisconsin Centrifugal-Armour Research teamwork is a repeat of the ancient adage that you don't necessarily need to be big to be good. Wisconsin Centrifugal, in sponsoring the Armour Research project provided itself with a spanking new castings market. But as the sponsor, it was a case of a 75-man David utilizing a research Goliath. Research that Wisconsin no longer had facilities to handle, was moved to the Foundation.



Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

SCRAP: Shortage Threatens Steel Output

World-wide scrap shortage predicted . . . Europe facing a steel production crisis for lack of scrap . . . Britain is prime example . . . Political overtones of the struggle for scrap will echo in Washington—By *Eliot Janeway*.

◆ EUROPE faces a steel production crisis in 1955 because of imminent shortages of scrap and iron ore.

Scrap exports from the U. S. last year were estimated at 1.1 to 1.2 million tons as compared to 271,000 tons in 1953. Outlook for '55 is staggering.

Let's take Britain as an example. But remember that German demand about equals Britain's—and to calculate the total impact you must add the rest of the Free World and leakage through the Iron Curtain.

Export totals for 1954 are already misleading as an estimate for 1955. From now on Britain alone is likely to require as much American scrap as was exported to the entire world in 1954.

Will Double Capacity

British business and national economic planning are out of step with the political dynamics which are creating everywhere new demand for the world's resources—on both civilian and military account. British attitudes assume world-wide normalcy — hence no need for the materials stockpiling necessary to the United States' continental economy and vital to Britain's island economy. Attitude No. 2 assumed an American depression—hence a business incentive to strengthen the Pound by holding back on imports in anticipation of distressed sellers.

Britain's ambitious — and demand-justified — steel expansion Plan calls for almost doubling capacity in a little over a decade: 1945 capacity was 11.5 million tons; '52 and '53 were 16.7 and 18.5 million tons, respectively; last year's was estimated at 18.5 million; and the Plan calls for 20.5 million tons of steel capacity by 1957-58.

As to ore supplies, Britain's main fields are being depleted as well as being of decidedly poor grade. The Plan assumes Britain's ore reserves are inadequate to support the 20.5 million ton steel capacity. Hence the Plan aims at providing 4 million tons of new ore — equivalent because of poor grade to about 3 million tons of average imported ore.

Depend On Imports

Projected 1957 ore imports are 16.0 million tons as compared to estimated 1954 ore imports of 12.0 million tons and 1953 imports of 11.0 million tons.

Actually Britain must depend on imports for the expansion. The question is what will Britain import: scrap or iron ore? If, for lack of scrap, she must go the iron ore route, she will need more blast furnace capacity and coking coal.

Given the scrap supply outlook, success of the Plan depends on its long-term provision for iron ore imports on the scale required to offset the world-wide scrap shortage. This, in turn, will be more or less acute depending on whether British ore import planning is more or less realistic.

Unfortunately, the conclusion to which I find myself driven is that Britain's long-term import planning—like current buying here—is woefully unrealistic. Reason: Failure to reckon with the "scrap gap." Only ore can close this gap. But this will take years, billions, and, first of all, the shock which 1955 holds in store for the Anglo-American political economy.

Speed Iron Boost

Difficulty of Britain's systematic Plan—which does make provision for balancing facilities back to the furnace, thence back to the ground —does not arise from what it sets out to do but from what it assumes need not be done.

Any assessment of the Plan must allow for the fact that it was conceived in 1951 when European scrap (and steel) moved westward to balance American deficits. True, it caused enough of a squeeze to stimulate the blast furnace phase of the Plan. But its ore phase still assumes world-wide scrap normalcy—that is, supplies varying from comfort to glut. But the contrary is true.

Admittedly, outside and over and above the Plan, exploration has

ELIOT JANEWAY, consulting economist and defense mobilization expert, is business trends consultant to Newsweek. He lectures on defense economics at the Industrial College of the Armed Forces, and the Woodrow Wilson School of Public Affairs, Princeton University. He's economic advisor to Builders Hardware, and is a frequent speaker before business groups. Formerly business editor of Time, he has been a special contributor to Fortune, Life, The New York Times, Saturday Evening Post, Harpers, Yale Review, Harvard Business Review, and Virginia Quarterly Review. He currently publishes a forecasting service—Janeway's Memos.

been going forward on a steadily widening front. Question is in scale and time needed before prospecting pays off at the mill. Having learned its lesson of too little and too late, the American steel industry has expanded literally from the ground up. American steel expansion began and continues as a race for iron ore both here and abroad.

Recognize Problem

Britain—and other European nations — simply built furnaces without making provision to feed them. This is a perfect illustration of the European failure (on both sides of the Iron Curtain) to understand that America (1) was not going to have a depression either, and (2) was also undergoing a resource-exhausting expansion.

Britain's Plan — at a too leisurely pace — does recognize the problem presented by iron ore: Thus the contract for 5 pct of Labrador's annual output — and the plans for opening new sources in French West Africa jointly with French and Canadian interests. Not only is time a crucial problem here—German steel interests (competing directly with the British) are also becoming more active.

In the short-range picture, Britain failed to take advantage of the 1954 U. S. iron ore depression and the broader slump in transatlantic shipping rates. Now Britain faces a bull market for the goods for which she needed the raw materials yesterday in order to be able to go on exporting from month to month.

Expansion program, calling for 8 new blast furnaces, will give pig iron capacity of some 15 million tons. This will call for 30 million tons of 50-pct ore—more if lower grade British ore is used. It seems reasonable that some two-thirds of the pig iron, roughly 10.5 to 11 million tons, will be available for steel production. This is based on 4 to 4.5 million tons going to iron foundries, a reasonable assumption since Britain has always used a high ratio of iron to steel and because of projected increases in industries using iron heavily.

This will leave British steel precisely balanced on a 50-50 pig-scrap ratio — a condition which must assume a free scrap supply. It allows no cushion of extra blast furnace capacity in the face of rising scrap prices. Even if the ore were suddenly available, there would be insufficient blast furnace capacity to make use of it. Blast furnaces also take time to build. And Britain has no time.

Plan correlates coke oven capacity with projected domestic ore production, increasing capacity 4 million tons. But there seems to be no provision for a steady flow of metallurgical coal. British have good reason to take their own reserves with a dim view. Yet the obvious incentive to stock up on American coal at its 1954 price (and at 1954 shipping rates) was ignored. German competitive bidding is another factor here.

As to scrap—which the Plan assumes will be freely available—a definite gap exists. Britain's home reservoir is admittedly depleted. Her growth is likely to prove lengthy and it is axiomatic that any growth economy must feed on a scrap reservoir because demand outraces supply of scrap generated.

As with coal and ore, Britain passed up some good opportunities to stock up on cheap U. S. scrap and low shipping rates in 1954. The European Community for Coal and Steel, by contrast has been considerably more active in this. By the end of September 1954, the Community had absorbed about 250,000 tons of scrap. Another 650,000 tons have been authorized by the Community.

Germany alone admits an import requirement of 75,000 tons of scrap a month—900,000 tons a year. And the trend of the headlines argues that Germany will put a defense tag on her claims.

What it means is that Europe is ahead of Britain, and probably ahead of the U. S., in the world-wide scramble for scrap. And Europe is gaining.

Assuming that all goes according to Plan, the British steel industry will need some 10 million tons of scrap annually to support the 20.5 million ton capacity. Where will the scrap come from? A 30 pct scrap rate at the mills would return something over 6 million tons, leaving 4 million to go.

Need 1-2 Million Tons

Factors adversely affecting Britain's ability to generate scrap at home include: Export of steel and steel-bearing manufactures; Britain's normally slow rate of equipment obsolescence; and Britain's boomtime premium prices to operators of obsolete facilities, an incentive to slow obsolescence.

Estimates vary as to how much of this 4 million ton margain British industry could generate. Two million tons would be a superb achievement. But it still leaves 2 million tons to go. This would have

Predicts World-Wide Scrap Shortage

Economist Eliot Janeway predicts a world-wide scrap shortage beginning in 1955 and lasting for some years. He reports fears are already mounting here that the export drain may aggravate our own domestic problem. And he predicts the political pull will pose a worrisome problem in Washington.

"While supplies dwindle, demand booms—here, in Britain, in Western Europe, and on the other side of the Iron Curtain.

"Some of the causes are:

"(1) Post-1945 Free World steel expansion; (2) Europe's galloping boom; (3) continuous large-scale siphoning of scrap across the Iron Curtain; (4) further depletion resulting from Korean War demand interrupting normal post-war reservoir rebuilding; and (5) European assumption that there will continue to be a freely exportable U. S. scrap surplus."

The views expressed in this article are those of Mr. Janeway. THE IRON AGE presents them because of their broad interest to industry.

to be imported. And, remember, that would be just enough to keep production going and no inventories could be built.

Conservatism suggests the possibility that imports could be held closer to 1 million tons—but only in the event of a British "crash" program.

Recalling that Germany duplicates this demand on a ton for ton basis and that other European nations will also be importing, this means that it must come from the U. S.

It also means that the U. S. will do well to come through 1955-56 losing less than 3 million tons of scrap a year. And the scramble could conceivably inflate the annual loss to 5 million tons. Any tonnage in this range packs a more powerfully inflationary wallop than most people yet realize, as well as significantly shortening the domestic supply.

Even as recently as the beginning of our own Korean shortage, our steel industry was set up—given boom abroad but not here—to tide England and Germany over a short and high scrap hump by shipping them conversion ingot. But the Korean shortage more than absorbed our conversion ingot and semi-finished capacity and brought European steel into America.

Head For Shortages

Some Britishers may be counting on American slump and European boom to supply them with a marginal flow of ingot and semi-finished. Canada has begun to ship slabs to Europe, but it can never be more than a trickle. Meanwhile, Canadian steel capacity is rapidly being sold out. In any case, our recent expansion has integrated us out of any marginal reserve of conversion material.

During the Korean shortage, Europe's exportable margin of steel surplus back-stopped our own deficits. The U. S. cleaned Europe of World War II scrap accumulation.

Now Europe's deficits are tugging at our scanty reserves. The entire world is. We are heading into another period of basic product shortages. Even if we are able to export scrap, we are not likely to be able to import steel. But the more scrap we export, the more steel we will need. Nevertheless, we must expect to give enough scrap to keep Europe going at capacity.

Scrap:

Buyers showing little interest in Chicago futures trading.

With the close of January futures trading last Friday, Chicago's Mercantile Exchange scrap trade was still unwell.

On Friday of last week No. 1 heavy melting closed at $36.50 with eight or nine open cars remaining for January. Traders estimate that at the height of the trading there were 70 open cars, and the total action involved over 241 trades since trading began last September.

A recent entrant, No. 2 heavy melting, which opened Dec. 15 on futures for February delivery, does not appear any stronger. At the close of trading last Friday $33 had been offered per gross ton, with no cars open.

Though the Mercantile Exchange continues firm in its future plans for scrap trading, there has been growing discouragement among traders in recent weeks. One factor was the decision to include No. 2 heavy melting as a trading grade rather than a penalty substitute for failure to make delivery of No. 1 heavy melting.

"Stop fawning!"

Though the addition was designed to bring more traders into the market, there is some feeling that the new grade encouraged the handful of active traders to spread their buying and selling activity more thinly, made what was already a thin, low volume market, thinner. Particularly so since the number of new traders didn't increase.

The next No. 1 heavy futures will close in March, for which month there are seven cars open. With $35.625 bid and no offers at the close of trading last Friday, the price remained at $36 nominal in absence of trading.

Particularly discouraging to at least one trader was the disinterest of purchasing agents who have to provide a final home for any scrap, whether traded in the cash or the futures market.

Those he had sought to educate in the advantages of hedging just didn't seem interested. Purchases by consumers just weren't there in the quantity needed to tonic a languishing market.

There are traders who like futures trading. But as of last week it seemed there just weren't enough.

Iron Ore:

Great Lakes ore shipments dropped 36 pct in '54.

Shipments of iron ore on the Great Lakes last year dropped 36 pct from 1953 levels. Total ore shipments carried by the Great Lakes fleet amounted to 60,793,697 gross tons compared with 95,844,449 tons the previous year.

The decline is attributed to the large carry-over of ore from the preceding season, reduced steelmaking operations during most of the time the Lakes were open for shipping, and imports of foreign ores including the first shipment into the Lakes from the newly developed fields in the Labrador-Quebec area.

Lake Carriers' Assn. reports shipments of the four principal commodities carried by Lake vessels (iron ore, limestone, coal and grain) fell from the record high of 199,696,932 tons in 1953 to 151,297,789 in 1954.

INDUSTRY: Trades Cost-Cutting Tips

Successful cost-cutting experience traded at meeting in Cleveland . . . Savings realized in purchasing, inspection, production, materials handling, and paper work . . . Workers share savings—By T. M. Rohan.

◆ DURING last year's torrid competition a good many companies learned new lessons in cost cutting. In Cleveland last week over 400 members of American Management Assn. gathered at a special conference on "Reducing Production Overhead" to hear how they did it.

Savings through purchasing this year at the Fansteel Metallurgical Corp., North Chicago, Ill., rare metal manufacturer, will exceed $250,000, according to J. A. Teece, vice-president and director of purchasing.

On 21 steel pulverizing hammers substitution of carbide tips for conventional hammers is saving $2689 per year and greatly reducing downtime. The company pulverizes over 100 tons of tantalite ore annually and regular hammers had to be replaced after handling one and one-quarter tons of ore.

Saved on Belts

Some improvement was made in hard facing material but not enough to warrant change. Tungsten carbide hammers were then put in and 40 tons of ore have been run with no downtime. By the end of the project 60 tons of ore per set of hammers are expected to be run with annual saving of $10,000.

On power transmission belts a salesman in the field came up with recommendations that saved $4563 in the first year and $2281 in subsequent years. The suggestions were removing belts and turning them end for end for an equal period of time to equalize stretch, and to turn the belt over at regular intervals for increased belt life. No one in the operating department or maintenance department had ever given thought to making these changes although the equipment has been used in the plant for more than 25 years. According to Mr. Teece "it was another case of being too close to the woods to see the trees."

Waste Time Works Well

Over $27,000 annually is being saved on substitution of nylon, dynel and orlon cloth filters over conventional cotton canvas filters in 20 medium and large size filter presses. Changes have been reduced from once every 3 months to once every 18.

On purchases of lime for neutralizing acid and chemical waste, $5592 per year is being saved through use of waste lime flue dust instead of commercial grades. The commercial type costs $22.72 per ton compared to $8.74 per ton for the waste material and annual usage is 400 tons per year.

Over 60 pct of the customers of the Norton Co., Worcester, Mass., abrasive manufacturer, were waiting for the company to process paper work although the parts were available from stock, according to R. T. Nelson, production manager. The stock shipping cycle has now been cut by more than half by having the sales order carry the same authorization as a requisition for disbursal of material. When the order has been filled, sales order is then sent to the Planning Department for paper work. Planning routine is thus carried on after the parts are in transit.

Reduce Hauling

Purchase orders on a million dollar inventory schedule are now issued within a week after release of the stock schedule compared to

AS PART of its diversification program, Baldwin-Lima-Hamilton Corp. last week acquired Hydropress, Inc., and its subsidiary Loewy Construction Co. Erwin Loewy, well-known industrial designer (right), shown completing the transaction with B-L-H head Marvin Smith, will remain as president of both Hydropress and Loewy Construction.

2 to 3 weeks previously. This is done through ordering material as one of the first steps in the planning procedure with purchase orders in the form of tabulating machine cards which are duplicates of the authorization cards for originally ordering the item.

Through plant rearrangement, trucking distances for parts have been cut from 50 to 90 pct. In one glaring example, distance of 5200 ft. was cut to 1200. Utility labor has also been decreased 25 pct through use of two tool cribs for five production lines compared to six previously. More systematic flow of materials has permitted reduction of inspection force by 20 pct, storekeeping by 5 pct and supervision force by 15 pct.

Save on Inspection

A. Richard Todd, president of The Todd Co., Rochester, N. Y., checkwriting machinery manufacturer, said that his company budget for last year indicated $700,000 must be saved to show a profit, based on sales forecasts and $500,000 was to come from manufacturing departments in production costs. After conferences with staff personnel, studies were completed within 2 weeks which secured an immediate reduction of manufacturing expenses of approximately $425,000 on an annual basis and an additional $80,000 spread out over several months.

Inspection costs alone were reduced by $100,000 per year. Mr. Todd emphasized quality is the result of training and selection of production workers—never the direct result of the inspection operation as such. Installation of a new inspection system with 7 categories also resulted in re-examination of tolerances, systematic check-up and condition of gauges, and reemphasis on quality at various production points, resulting in additional savings. Preventive measures such as more frequent sharpening of tools and changes in machine tool speeds were also started with additional savings.

In the first month rejection of lots ran about 50 pct due to faulty parts. This has now fallen to 6 pct as a result of operator improvement and the desire of all to trace the difficulties of its source and start a remedy.

Eastman Kodak Co. figures its annual savings through improved materials handling at $550,000 according to R. C. Ross, industrial engineer. A training course for fork truck operators is saving $80,000 annually and pays for itself in one year. Drivers must take physical examinations and "cowboys" who drive through low doorways without lowering the lift fork and slam the truck into reverse to stop it are eliminated.

Up to three trailers are used behind straddle trucks for greater utilization. Standard pallet patterns are also printed on each of the cardboard containers for the 25,000 different products, making stacking an easier job. Two-way truck radios installed on 30 units also saved $16,000 the first year.

Paper work simplification had paid off $234,000 by mid-1954 at the Thomas J. Lipton Co. according to R. E. Clark, procedure analyst.

The major problem in bringing about employee cooperation is convincing them they will not lose jobs as a result of drastic slashing in paper work procedure, according to Mr. Clark. "We do not guarantee that there will be no changes or shifts in jobs; no company can guarantee that. We are fortunate as a growing company to be able to assure our people that if their job is eliminated as a result of a paper work change, their services will be absorbed in another function," he said.

What Companies Pay for Employee Ideas

How much does your company pay for employee suggestions?

At the meeting of the American Management Assn. in Cleveland last week, a show of hands was taken on size of rewards to employees in percent of savings realized. This indicated 35 plants paid off in the 5 to 10 pct bracket; 14 paid off in the 10 to 15 pct bracket; and 30 paid over 15 pct. For 10 plants, payments continue into the second year.

All indicated that plant improvements for which no actual production saving can be traceable, such as rearrangement for operators' convenience, etc., are paid a nominal sum of roughly $25.

Small Business:

House group talks about tax cuts, other aids.

Small business concerns finding themselves in a rough battle with larger competitors need additional government protection and possibly tax cuts, according to a House subcommittee set up to keep an eye on the interests of the smaller concerns.

The subcommittee, in a special year-end report, calls for a "thorough congressional review" of all defense procurement policies in view of the slipping position of small business. It notes especially protests by small firms that Air Force policies are permitting "the giants of the industry" to take over an unfair share of aircraft procurement.

New policies permitting the large prime contractors to let subcontracts have resulted in making competition "virtually impossible" by many small producers, the report says.

Cut Small Business Taxes

Another complaint is that prime contractors, under the guise of considering a subcontract, often gain valuable engineering information only to use it in manufacturing an item themselves.

The group recommends that Congress consider cutting income taxes paid by small business to put them in a better competitive position, possibly by raising the tax exemption level.

Small corporations, with assets under $1 million, accounted for only 14 pct of total manufacturing sales in 1953, compared with 19 pct in 1947, and earnings, before taxes, declined 74 pct to 6 pct during the same period, according to the subcommittee's report.

APPLIANCES: Head For New Records

From a standing start in 1954 appliance makers pushed to record sales . . . In 1955 they say they'll do it again . . . Only this year they are starting strong . . . Second quarter steel is tight—By *K. W. Bennett.*

◆ FOR ONE MORE year appliance makers have broken the previous year's record sales. From a standing start in a dead slow January, 1954, the industry limped through first half. Reversing 1953, the builders whipped up sales in second half to break records established in 1953, mostly in the first half of that year.

In 1955 they say they'll do it again.

Vice president of marketing for Hotpoint, John McDaniel, has placed the 1955 advance at 4.5 pct for the industry, with his own firm shooting for a 15 pct increase.

Vice president Parker Erickson of Avco expects an advance of 1 million major appliances over the 11,430,000 sold last year.

President Homer Reeve of the Home Laundry Manufacturers' Assn. reports members' estimates of their 1955 sales advances range from 4 pct up through one hopeful 50 pct.

Booking Steel Ahead

After the 1954 showing, there will be few who will argue.

The sunny market forecasts and the sales advances of recent months are backed by strong steel and component buying. Some individual manufacturers had anticipated the strength of automotive buying of cold-rolled sheets in fourth quarter and were advancing their purchases of steel in third quarter. Yet the going requirements of the industry will see a 5-10 pct advance in steel intake in first quarter 1955 over the fourth quarter 1954 level.

The steel has already been booked, with producers, particularly in the Midwest, booked solidly through first quarter and selling second quarter steel on a "historical buying" (quota) schedule.

As has been the case for weeks, cold-rolled sheets and enameling iron are in tightest supply, with enameling iron generally reported as causing more trouble — April delivery is quoted. Cold-rolled sheets for April delivery are not in generous supply. At least a few purchasing agents in the industry are beginning to watch hot-rolled sheets carefully as regards second quarter supply, as well as cold-finished bars which have not been moving strongly.

Show No Alarm

Despite recurrent mill comment that hot-rolled sheets are readily available, at least one small manufacturer reports already buying this grade at warehouse, and others have been augmenting cold-rolled sheet inventories with warehouse buying. Hot-rolled sheets are listed by suppliers at 4 weeks, but deliveries have increasingly run to 5 and 6 weeks and longer.

Most appliance purchasing men don't admit to any great alarm over second quarter steel supplies, at least not publicly. Some early inventory strengthening is responsible, as well as the hope that automotive buying will hit a less strenuous pace as the first quarter draws to a close.

Buys For June

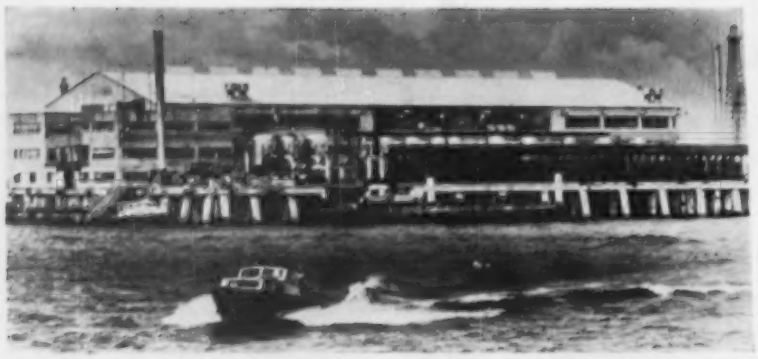
Privately one firm has authorized its buyers to order steel on 6 months lead time, is buying for June. All have junked the restrictions on long lead times that prevented many purchasing agents from laying in reserve steel when they wanted to back in early fourth quarter. Another frankly admits it is running behind on deliveries for one of its products because of raw material shortages. Ordering on 120 day lead time is increasingly common.

Inventories Look Different

Normally peak steel buying by the appliance makers coincides closely with the old March-April mill peaks, begins to slump in May and June. Currently prospects for strong buying through first half sound logical to most purchasing agents. The strong selling year, the low distributor inventories, the current high manufacturing rate, are cutting sharply into steel inventories that seemed generous in early fourth quarter.

One major buyer reported "We thought we were starting fourth quarter with a loaded inventory, but we took more in fourth quarter and we'll be taking a heavier tonnage in first and the sales end says they'll sell more. We may drop off in April."

"Must you sign your name to such suggestions?"



GAS PRESSURE maintenance plant sits 7 miles out in Lake Maracaibo.

Petroleum:

Compressor plant boosts oil production.

Seven miles out in Lake Maracaibo, Venezuela, sits a brand new $20 million compressor plant 80 ft above the lake bed and 4500 ft above an oil reservoir that is now producing some 10 pct of the world's crude oil output. Plant runs on byproduct gas—and is there merely to inject 137 million cu ft of the gas back into the earth at 1935 psi.

Purpose of the compressor plant is to bring about a 50 pct increase in production for that portion of the Maracaibo Basin oil field being pumped by Creole Petroleum Corp., an affiliate of Standard Oil Co. (New Jersey). It is also expected to boost the ultimate yield of its own field by a third.

Here's how the system works: Compressed gas is reintroduced to the earth through five injection wells. Effect is to force underground oil into the wells at the bottom of the formation, increasing production and literally sweeping up for eventual recovery more oil than would otherwise be obtainable.

COMPRESSORS boost gas pressure from 25 psi at intake to 1935 psi.

BATTERY of ten 6000-hp gas turbines power gas compressors.

About the size of a football field, the plant rests on 350 concrete piles. It took a year and a half to build. And it consists of some definitely unusual equipment.

One of the problems encountered was vibration. Centrifugal compressors were specified to ease this problem. But outlet pressure had to be 1935 psi and no compressors of this type had been built for pressures over 1000 psi. So special compressors were designed and ten were built by Ingersoll-Rand capable of 2000 psi discharge pressure.

Compressors are powered by ten General Electric gas turbines of 6000 hp each. They burn gas that is a byproduct of the oil production.

Ford Has Gas Turbine

Ford has rounded out the Big Three in having a gas turbine engine of its own to play around with for experimental and testing purposes.

General Motors, in review, showed its Firebird a year ago and subsequently a turbine powered coach. Chrysler put its gas turbine into a Plymouth body for the first conventional car to be powered by a turbine.

Ford was late in starting its turbine research and hasn't as yet put its product into a wheeled vehicle. Albert H. Beaufrere, manager of Ford's gas turbine department, emphasized that his group's only concern at this time was to develop and improve components as separate packages, not to introduce a complete engine.

The engine employs a heat exchanger of the regenerative rotarymatrix type which occupies a minimum of space.

Boost Tubular Capacity

Increased capacity for oil country tubular goods is planned for National Tube Div. of U. S. Steel Corp. Work is starting on facilities designed to triple production of deep well casing at the National Works in McKeesport, Pa. The new equipment will be in production in about a year.

Also National Tube plans to add new upsetting units at its Lorain (Ohio) Works to increase production of external upset API tubing in the 2⅜ to 4½ in. OD range.

BUDGET: Ask Less Funds Next Year

President's proposal calls for about $1 billion less spending . . . Deficit expected to be cut about in half . . . Defense accounts for about 65 pct of total . . . Air defense gets big share—*By N. R. Regeimbal.*

◆ PRESIDENT EISENHOWER is shifting emphasis in his budget for the fiscal year beginning next July 1 to building up aerial defense for all three branches of the military and for research and development of guided missiles and "advanced weapons."

The President's initial proposal calls for expenditures of $62.4 billion, of which $58.6 billion would be in new spending authority. Expenses this year amount to $63.5 billion. Revenues are estimated at $60 billion, an increase of $1 billion over this year, due to increased economic activity and resulting higher tax collections. A deficit of $2.4 billion is forecast, compared with a $4.5 billion deficit this year.

Defense appropriations will take 65 pct of the total budget. Some $34 billion would be for the military; $2 billion for atomic programs; $700 million for stockpiling, and $3.6 million for military security.

By major categories, here is what Ike proposes:

Aircraft . . . About two-thirds of the military budget will be for air power and related programs, the largest in peacetime history. The active aircraft inventory of all branches of the service will be increased from 34,000 last June to 36,000 in June, 1956, until the goal of 40,000 is reached. Primary emphasis will be on jets. Modernization of airpower will continue during the buildup.

Goal of the program is 137 wings for the Air Force, of which 130 wings—119 of them combat—will be operational by June 30, 1956. The Navy will increase its carrier air groups from 16 to 17 and 15 antisubmarine squadrons.

Manpower . . . The number of military personnel will be reduced from 3.2 million to about 3 million by next June 30 and to about 2.8 million by June, 1956. Within these figures, however, the personnel of the Air Force will be expanded.

Shipping . . . The President wants new obligation authority for ship construction of $103 million to continue the tanker trade-in and build program; replace cargo ships built during World War II; provide for construction or conversion of four passenger-cargo ships and continue research of ship design. The government appropriation will be more than matched, with the total approaching $225 million in addition to the $400 million program already underway and expanded naval construction in private shipyards. This, he says, should form the nucleus of peacetime shipyard employment.

Machine Tools . . . The Defense Department would be granted another $100 million for procuring so-called "elephant" machine tools for its reserve program.

Continental Defense . . . Continued heavy outlays for research and development of various types of guided missiles are proposed in the defense budget. The continental air defense command will continue setting up Nike guided missile defense stations around major cities and industrial areas; the radar warning system will be expanded, and additional fighter stations will be established.

Atomic . . . Development of atomic energy for defense purposes will continue, with emphasis being placed on stockpiling nuclear weapons.

Defense Production . . . Expenditures for promotion of defense production will drop from $1 billion to $638 million in 1956, mainly as a result of reduction in the synthetic rubber and tin programs. The stockpiling program will continue to add minimum amounts of critical materials, as well as keep essential industries functioning, such as the lead and zinc mining industry.

Autos:

GM head predicts 7.6 million car, truck output in '55

General Motors President Harlow H. Curtice announced a $500 million capital expenditure for 1955 to keep pace with "growing demand" for GM's products.

Addressing 550 business and industrial leaders in his annual pre-Motorama prediction and forecast at New York's Waldorf-Astoria this week, he estimated a 1955 production of 7.6 million cars and trucks for the automobile industry.

He qualified his estimate of a domestic market of 6.8 million vehicles with the provision that "we continue to enjoy labor peace." It was an obvious reference to the forthcoming May 29 expiration of the 5-year labor contract with the United Automobile Workers.

He predicted that in 1955 GM's unit sales will be the highest in the company's history and sales in dollars will approximate $10 billion, despite a decline in defense business.

He disclosed that GM spent more than $600 million to bring out the 1955 models, an amount nearly twice that spent in tooling up for its 1954 lines.

Jets:

Piloted fighter-bombers take off from truck.

Elimination of airports — and their necessarily long and vulnerable runways—has taken another step forward with the development of a truck-mounted launching system for piloted jet fighter planes. Jointly developed by the Air Force Air Research & Development Command and Glenn L. Martin Co., the "zero-length" takeoff system has been used in launching the Martin Matador, a pilotless missile. Same equipment is now used in launching standard F-84-G Thunderjet fighters.

Here's how it works: The Thunderjets are modified so rocket booster bottles can be attached below the plane's tail; movable arms on the mobile launching truck aim the fighter skyward; the turbojet engine is run up to full speed; and the boosters are fired.

Can Carry A-Bombs

All this thrust results in a peak acceleration of 4 G's. This is equivalent to reaching a speed 88 mph from a standing start in 1 second and adding 88 mph for each second the acceleration is maintained. Actually, Martin test pilot Bob Turner says the jolt is less than that of standard catapult takeoffs.

What this means to the military is that front-line airstrips may no longer be necessary, that fighters can be dispersed and launched almost anywhere a truck can drive. And the F-84-G is capable of delivering tactical atomic bombs.

Landing, however, still requires an airstrip of some sort. But, especially by using arresting methods similar to Navy carrier practice, these need not be nearly so long as conventional takeoffs require.

Earlier steps in the elimination of runways were taken by the Navy with the Martin SeaMaster jet flying boat, Convair's water-based Sea Dart fighter and vertical takeoff (VTO) planes by Convair and Lockheed.

STANDARD MODEL Air Force jet fighter blasts off from truck launcher.

Seeking Seaway Bids

St. Lawrence Seaway Development Corp. is seeking bids on its second major contract, excavation for Robinson Bay Lock—about three miles northeast of Massena, N. Y.

Project calls for excavating an area 200 feet wide by 1200 feet long to bed rock, about 115 feet deep. Lock construction contracts will be awarded later. Drawings and specifications are available at the Office of the District Engineer, Buffalo, N. Y.

Advertising dates for later projects include: Grass River Lock excavation, Feb. 15; Long Sault Canal excavation and dike construction, Mar. 15; Thousand Island section channel dredging, June 15, 1956, and Cornwall Island south channel dredging and canal excavation, Sept. 15, 1956.

Set Price for A-Matter

Prices which Atomic Energy Commission has newly set for its payments for products of privately-run atomic reactors will in general be guaranteed during the 7 year period beginning July 1.

Materials affected are privately-produced plutonium and uranium-233. Prices for them will be altered only if there are substantial changes in the wholesale price index of the Bureau of Labor Statistics.

New AEC schedules also are worked out for basic charges the domestic licensees must pay for natural uranium, thorium, heavy water, U-235, U-233, or plutonium to be used in peacetime applications of atomic energy.

The last three items can only be leased by the licensees, while the others may be sold or leased.

Try Atomic Warheads

Ordnance crews may set off guided missiles with atomic warheads during Atomic Energy Commission tests in Nevada during February.

Types of weapons to be fired at Frenchman and Yucca Flats have not been named by AEC. It is believed, however, that guided missiles, including ground-to-air types, may be among those tested.

Defense Dept. now gives high priority to development of ground-to-air and air-to-air missiles equipped to carry atomic warheads.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representative.

Transmission, assembly 1257 ORD 7412496, $362,685, New Process Gear Corp., Syracuse, N. Y.

Kit—front axle modification type MA-1 LAW, 1341 ea, $227,312, The Waco Aircraft Co., Troy, Ohio.

8100-354651 grinder, heavy duty, wet surfaces, LAW, 211 ea, $338,790, Lempco Products, Inc., Bedford, Ohio.

Locomotives, 16 ea, Pressed Steel Car Co., Div. of U. S. Industries, Inc., New York, N. Y.

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Wearability—*Outwears other tool steels 3 to 1*

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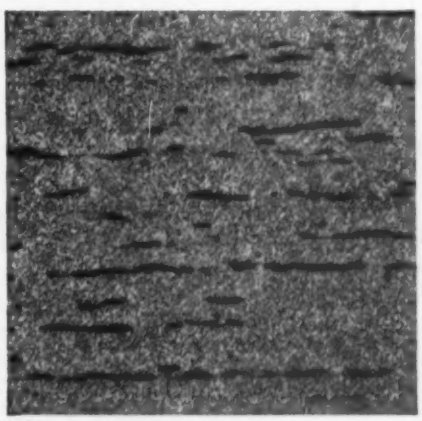

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In your plant, Graph-Mo steel will cut production time and rejects. Because of its graphitic structure, Graph-Mo steel machines 30% faster than other tool steels. This structure also gives excellent resistance to abrasion, and has minimum tendency to pick up, scuff or gall. Tests on Amsler Wear Machine show Graph-Mo has twice the resistance to galling when compared with ordinary tool steels.

The greater stability of Graph-Mo steel enables you to make gages that stay accurate longer. After 12 years of service, for example, a typical Graph-Mo steel master plug gage showed less than 10 millionths of an inch change from its original dimensions.

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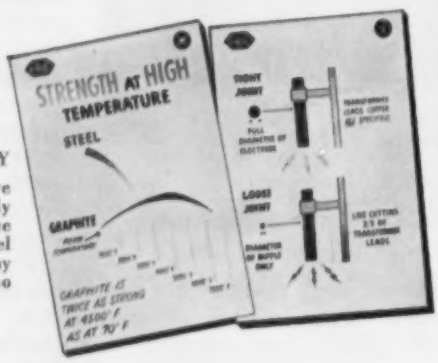

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". . one of the best things that ever happened to educate the men on the furnace."
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". . the men are more careful now."
". . proved very beneficial in better handling of electrodes."

"Great Lakes takes the long-range view that it is better to sell an extra carload of electrodes because a customer has added another furnace, than because he is getting less-than-optimum service out of his existing equipment"— from an article in STEEL.

Report To Management

We Keep on Building

It's now official. Construction activity last year set an all-time record with outlays amounting to $37.2 billion, 5 pct above the previous high established in 1953. The 1954 record marked the eighth straight year construction business reached a new peak.

Expenditures for new private construction last year totaled $25.7 billion, up 8 pct from 1953 and topped outlays for all previous years even after adjusting for price increases. All types of private construction expenditures gained over 1953 with the exception of industrial plant, farm, railroad and gas utilities.

But despite the construction industry's break-neck pace, it is still not keeping up with demand. F. W. Dodge Corp. reports December construction contract awards for the 37 states east of the Rockies totaled $1,828,837,000. This is a whopping 41 pct increase over December 1953 and is one of the highest monthly totals ever recorded despite the fact that winter is traditionally a slow period for construction contract awards.

Since construction contract awards represent building to be worked on in the near future, the December burst of contract awards means construction activity is off to a solid start in 1955. The Dodge announcement is important because it is the first definite evidence to back up the many optimistic business forecasts that have been made for the current year.

There will be trouble spots during the current year of course: Unemployment will be up enough to be troublesome, new plant and equipment expenditures will be down, credit will be tighter, there won't be any tax breaks to give business a bump the way there was last year and labor could cause some headaches. But with construction, automotive and steel all headed for more business than in '54, anyone who believes 1955 could be the best year in the history of our economy won't be too far off the beam.

Need Better Public Relations

Certainly businessmen have done a lot to dispel the "Robber Baron" reputation which has hung on for so many years, but they haven't yet completed the job of telling their story to the public. Recent survey by Opinion Research Corp. of 1100 manual and white collar workers showed these surprising results:

Asked who has done most to protect the freedom of the individual in this country, 59 pct said government leaders, 18 pct credited union leaders, while only 7 pct listed business leaders.

On the question, "Who has done the most to improve the living standards of the people in this country?", 47 pct said union leaders while 18 pct listed businessmen.

Other parts of the survey showed that people have a generally high regard for business leaders, but the responses to some of the questions show definitely that business has failed to explain its role in society adequately.

How to Buy a Car in Moscow

Russia has supposedly been trying to make life better for the people—step up production of consumer goods, raise the country's standard of living. But its recently issued regulations covering new car purchases won't make life any easier for the average Russian.

If you want to buy a new car in the Soviet you have to: (1) go to a government-owned sales shop and present a certification from the police and the registration office that you don't already own a car that you are planning to sell; (2) then you have to deposit the full purchase price of the new car in return for which you get a certificate that the vehicle will be delivered within a year; (3) finally, you have to guarantee to keep the car for a certain number of years.

Reason for this, according to National Automobile Dealers Assn., is to break up a racket whereby speculators place agents on car waiting lists and then resell the cars privately at a big profit.

INDUSTRIAL BRIEFS

Dismiss Charge . . . On motion of a U. S. attorney, a federal court has dismissed charges that Lorenz A. Ver Bryck, New York, violated the Wartime Materials Act. Mr. Ver Bryck was one of five persons charged with illegal transactions involving the sale of steel pipe which was subject to the government's Controlled Materials Plan.

First Winner . . . American Institute of Mining & Metallurgical Engineers awarded Stewart J. Cort, vice-president, Steel Div., Bethlehem Steel Co. and a director of Bethlehem Steel Corp., the Benjamin F. Fairless Award. The citation commended Mr. Cort for "his leadership in iron and steel manufacturing which has made his company an outstanding producer in the industry."

Nearing Completion . . . General Electric Co.'s regional warehouse and distribution and sales office is nearing completion at Birmingham. W. C. Lanham will be manager.

Appointed . . . Baldwin-Lima-Hamilton Corp., Lima, Ohio, has appointed the Kentucky Equipment Co., Inc., 3611 St. Germaine Court, Louisville, as distributor for Lima shovels, draglines, cranes and pull shovels.

Established . . . Carborundum Co. established a new operating unit, the Electro Minerals Div., to manufacture and sell silicon carbide and fused alumina crudes, abrasive grain and related electric furnace products in the U. S.

Being Installed . . . Aluminum Co. of America is supplying corrosion-resistant aluminum highway railing for the new Ohio Turnpike. The lightweight railing will line approximately 200,000 ft of bridge structures, overpasses and underpasses.

Dividend . . . Borg-Warner Corp., Chicago, declared a quarterly dividend of 42½¢ per share on the common stock payable on Mar. 2 to stockholders of record on Feb. 9.

TEN THOUSANDTH Junior Achievement Co. charter goes to Richard Wood, Asheville, N. C. Making the presentation are (l to r): E. Caldwell, Hyster Co.; G. K. Rose, Chase National Bank; F. A. Vollbrecht, Industrial Wire Cloth Products. Purpose of the organization is to help teen-agers gain a better understanding of the principles of American business through operation of their own small-scale corporations.

New Firm . . . S. W. Brown has opened his own business as a consulting engineer with offices in the Chrysler Bldg., New York. His firm will specialize in the design and application of air conditioning and refrigeration systems.

Profit-Sharing . . . Atlas Mineral Products Co. has established a profit-sharing plan for the benefit of all its full-time employees. Income from this plan is divided into a pension fund payable at the age of 65 along with an annual cash bonus.

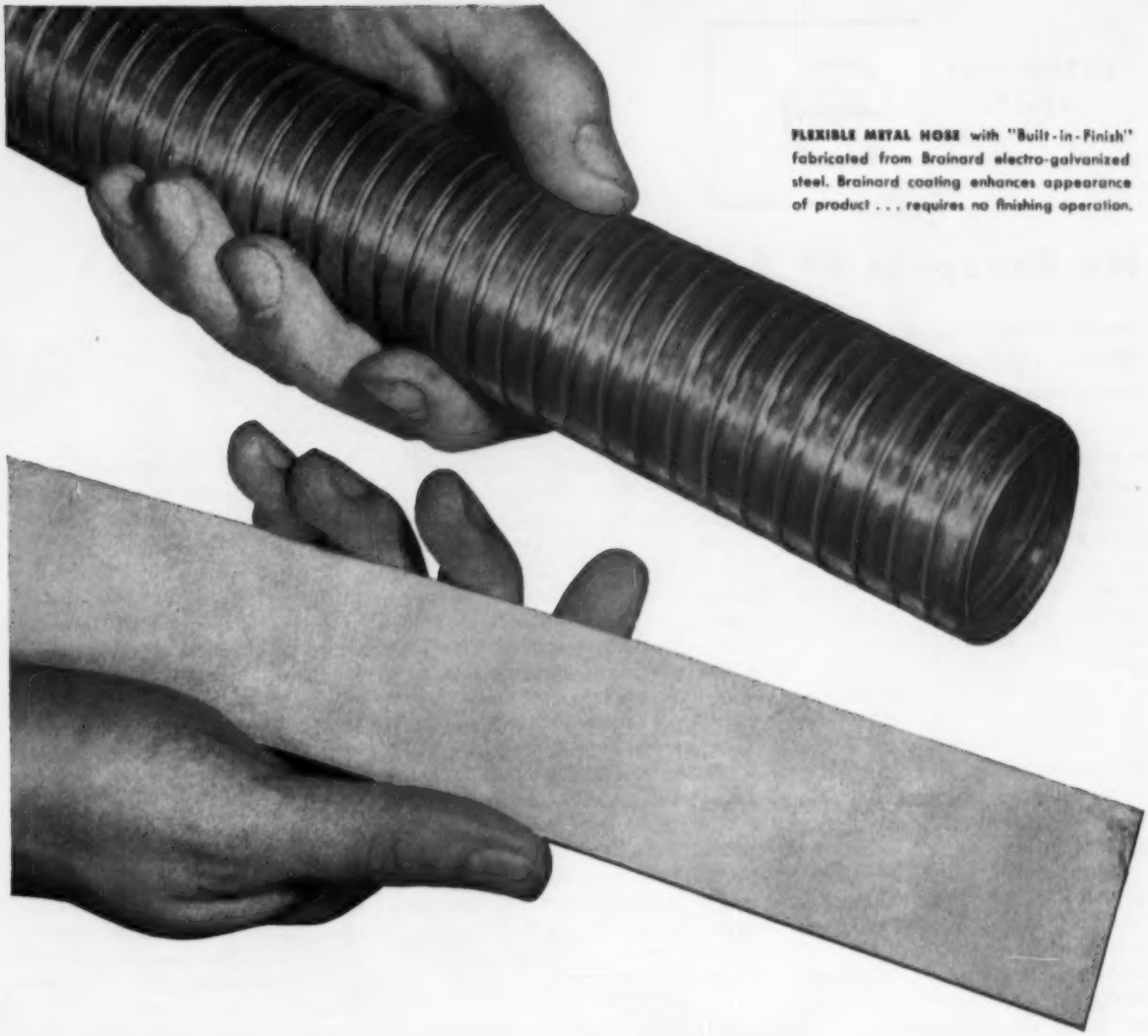
New Moniker . . . Welduction Corp. is the new name of the former Weltronic Induction Heating Corp., Detroit.

Industry Council . . . Collapsible Tube Manufacturers Council has been formed to represent producers of this type of metal containers. Primary aim of the council is to unite the thinking and energies of the industry in promoting the important packaging role played by collapsible metal tubes.

Completed . . . Eclipse Fuel Engineering Co. of Canada, Ltd., has completed a new 10,000 sq ft plant at 20 Upjohn Rd., Toronto. Company is a Canadian subsidiary of Eclipse Fuel Engineering Co., Rockford, Ill.

New Prexy . . . James H. Coolidge, vice-president — finance of Thompson Products, Inc., Cleveland, is the new national president of the Motor & Equipment Manufacturers Assn.

Any Problems . . . The Second Annual Material Handling Training Conference will be held on June 19 through July 2 at Lake Placid, New York.



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● Products fabricated from Brainard electro-galvanized steel have lasting protection against rust and corrosion . . . yet require no expensive plating or finishing operations. Galvanized coating, an integral part of the steel, is not affected by forming. Brainard galvanized steel can be fabricated by all standard methods.

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AUTOMOTIVE ASSEMBLY LINE

No Prospect of Atom Power For Cars

Practical radiation shielding is the insoluble problem in view of today's knowledge . . . Safe shield would weigh 40 tons . . . Auto industry learns value of radioactive testing of materials—By *R. D. Raddant.*

◆ ENGINE SPECIALISTS in the auto industry can stick to such known power sources as the piston engine and gas turbine. Possibility of powering an automobile by atomic energy is so remote at present that it isn't being considered in automaker's research plans.

Nuclear fuel for automobile use "is not in keeping with the facts as we know them today; unless one wishes to carry around some 40 tons of some shielding for a car of less-than-conventional horsepower."

These words dismissed atomic automotive power from the scene last week when Alfonso Tammaro, assistant general manager for research and industrial development of the Atomic Energy Commission, discussed the potential contribution of the automotive industry to the field of atomic energy.

Use Radioactive Materials . . . He told the Society of Automotive Engineers in their home town of Detroit that practical applications of atomic energy to the auto industry were more likely in the direction of using radioactive materials to obtain information cheaper, easier, or faster, or in cases where the information can be obtained in no other way.

At the same time he spanked the industry for not taking advantage of the opportunities offered, an unusual thing to hear in Detroit. He pointed out that of 68 industrial companies engaged in 17 groups studying the feasibility of atomic power, only one is a representative of the auto industry.

Ford Uses Isotopes . . . Although the strong implication is that auto engineers are not exploring atomic energy possibilities as thoroughly as they should, Mr. Tammaro pointed out that Ford has been a leader in the use of radiographic (non-destructive) testing with artificially produced radioisotopes. Excellent photographs have been obtained showing the efficiency of this method for detecting small voids in castings and imperfections in welds and castings.

Now more than 350 other companies are using this method with profit. Ford also pioneered in the use of a liquid-level radioisotope gage for measuring and controlling the level of molten steel in a cupola or furnace.

Test Ring Wear . . . But it was an oil company that devised a method of measuring wear of piston rings in an automobile engine. By using radioactive piston rings, the amount of wear was measured in radioactive material in the oil. This reduced measurement time from months to minutes and a potential research budget from $1 million to $35,000.

Chrysler Corp. developed a method of measuring the wear of breakerpoints in the ignition system. Radioisotope thickness gages are now in use in more than 400 companies for measuring the thickness of varied materials such as rubber tires, brass, steel, aluminum, plastics and others.

Learn New Techniques . . . It was pointed out that automotive engineers would have to return to school to learn, under conditions involving nuclear radiation, how to make the conventional tests they are familiar with under non-radioactive conditions.

For example, they would need to learn how to machine parts to close tolerances while working behind several feet of lead or concrete shielding viewing their work by means of three-dimensional polarized light television. Complex subassemblies and remote control handling devices would be necessary for work on radioactive materials.

"After our automotive engineers have gone back in sufficient numbers to school and to the laboratory, then would come the time for a sober reappraisal of the extent to which the automotive industry could aid our atomic program and whether an extrapolation of the automotive engineers' knowledge along conventional lines would be of use in solving these new problems," Mr. Tammaro said.

Turn Page

"And the spikes are chrome-plated in the new '55 model."

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made of flat-rolled steel

Appliances as well as kitchen equipment like cabinets and sinks need a good *suit of armor*—made of flat-rolled steel—when they're put to the test of normal use.

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Toolmakers, punch and die makers, machinists and others using tool and die steel can eliminate expensive "grinding to size" by using Simonds precision ground high grade tool steel. With hundreds of newly added stock sizes to choose from, you're almost certain to find the exact size you need so that you save both time and material cost. What's more, you have a choice of time-tested OIL HARDENING or AIR HARDENING type steel, whichever you require. Stock sizes are ready for immediate delivery. Get full information, including New Wall Chart (18″ x 31″) and Data Book from your Simonds Die Steel Distributor.

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18″ and 36″ lengths) with simplified heat treating instructions.

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Jan. 15, 1955	161,882	22,425
Jan. 8, 1955	156,445	21,532
Jan. 16, 1955	123,231	26,610
Jan. 9, 10, 1954	125,622	26,796

*Estimated. Source: *Ward's Reports*

See Possible Sales Tie

The top spot in the industry is still in doubt with Chevrolet and Ford each claiming the No. 1 position. It may be that each will be able to lodge a legitimate claim to victory. In that case, it could well be a standoff.

Chevrolet has earned the production victory, but Ford was claiming a sales victory even before 1954 was over. You can make your own decision as to what constitutes the No. 1 position, sales or production.

As expected, Chevrolet led in production with 1,414,365 cars to 1,394,762 for Ford. Accepting that, how can Ford still claim leadership?

With difference of less than 20,000 cars, much less than a week's production of either make, dealers' unsold inventories and exports could well place Ford in the lead, if that happened to be the case. In any event, it was the closest race in many years and credit goes to both.

Trends:

Predict lower lighter cars for high speed travel.

A lighter, lower automobile with many concessions to the high speed travel on turnpikes and expressways may be the future design of the American automobile.

Maurice Olley, director of research and development at Chevrolet, sees no immediate prospect for a general acceptance of radically smaller cars, "in spite of, and perhaps because of, the increasing numbers of small imported cars in our midst."

Mr. Olley, who gained most of his early automotive experience in England, believes that weight reduction in materials and design may lower the weight of the car of the future without necessarily decreasing size.

"Engineers are more weight conscious every year," he said, "gaining experience in raising safe stress levels, and are continually finding simpler and lighter ways of accomplishing results. So, the average weight of 3250 lb will not be much exceeded in the next ten years, and it may be reduced."

Predict Lower Cars

Mr. Olley believes that the forward and downward direction of the passenger space in the car will continue. This trend was made possible by independent suspension, which years ago permitted engineers to lower the engine between the front wheels, instead of on top of them.

The expressway factor, as the interstate highway system grows and improves, will result in new cruising gears for high rates of speed with a smoothly operating stepdown gear for rapid overtaking.

Consistent high speeds, Mr. Olley feels, will demand the elimination of wind noises. This can take place through the modification of air flow around the windows, or by abandoning windows entirely, except for vision, by using flush glass and air conditioning, as is the practice in aircraft today.

Change Studebakers

Studebaker will be the next car to wear a wrap-around windshield.

After a short shutdown during the holiday season to make the tooling changes, a new Studebaker with that now universal feature began to roll off the South Bend assembly line.

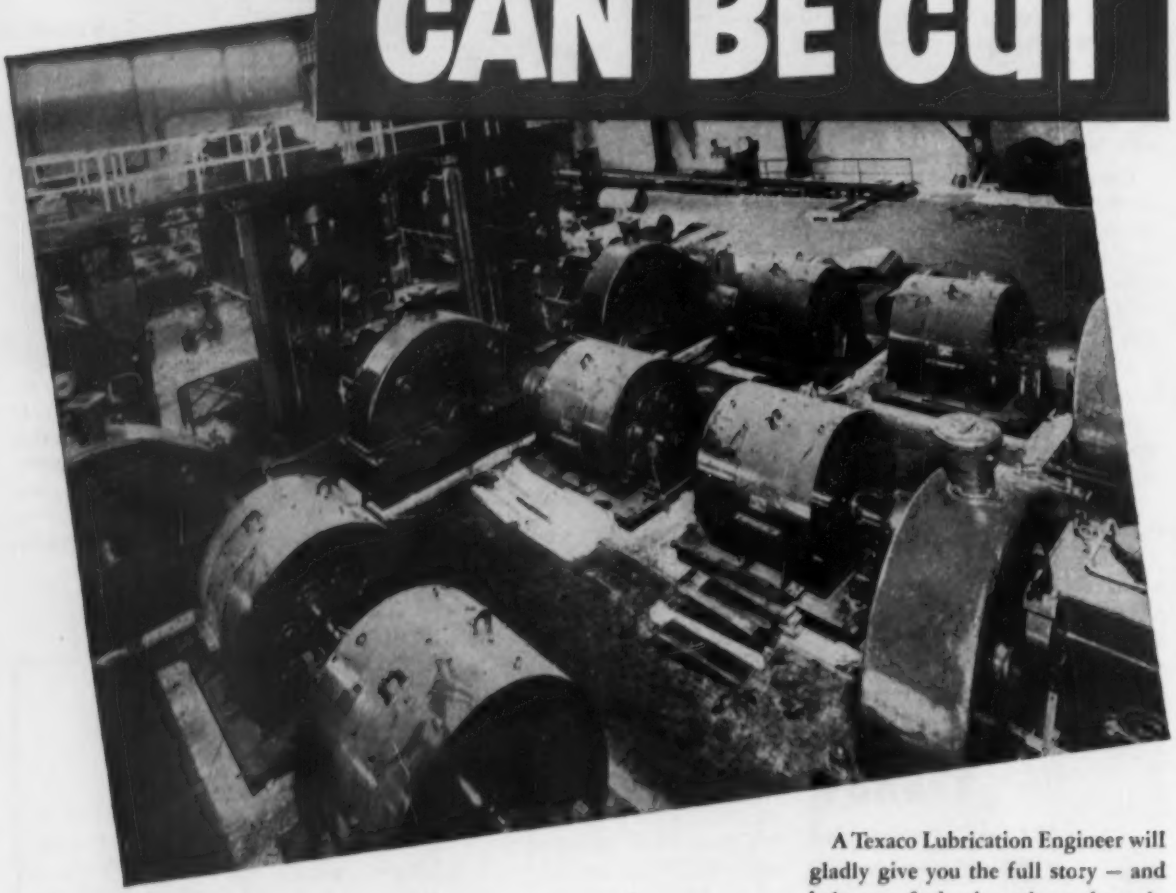
The modification was the first of several mid-season changes that are expected during the 1955 model year.

Incidentally, the trend to wrap-arounds was so complete this year that it led to some production problems in the glass industry. Apparently they have been solved to the extent that windshield shortages are not hampering automotive production.

THE BULL OF THE WOODS — **By J. R. Williams**

HE WORKS AT LOOKIN' IMPORTANT.' HE RUNS A DINKY LITTLE LATHE AN' GIVES THE IMPRESSION IT TAKES A LOT OF STUFF TO TURN IT.'
IF HE LEFT THE TOOLS LAYIN' ON TH' MACHINE, IT WOULD LOOK LIKE A LOT BIGGER MACHINE.'
THE BIG WHEEL
J R WILLIAMS
1-21

Where to look for COSTS THAT CAN BE CUT



AS EVERY mill operator knows, reduced costs mean increased profits. And there are many ways and places where effective lubrication — *Texaco* — can help you.

Your rolling operations, for example. On the drive side, *Texaco Meropa Lubricant* will keep gears and bearings fully protected and add substantially to their life. For the roll bearings themselves, *Texaco Regal Oil* in the circulating system is your best assurance of full protection and low maintenance costs.

A Texaco Lubrication Engineer will gladly give you the full story — and help you find other places throughout your mill where costs can be cut and production efficiency improved.

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TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

THIS WEEK IN WASHINGTON

Ike-Stassen Push for More Red Trade

Administration believes increase in nonstrategic trade with Reds will cut into Communists' world strength . . . But many in Congress disagree . . . Coal operators seeking aid from government—By G. H. Baker.

◆ IKE and Foreign Aid Chief Stassen are mapping plans to sell Congress on the thesis that an opening up of "nonstrategic" trade with the Reds will eventually be a factor in softening up of Communism around the globe.

Not all congressmen are convinced that the Ike-Stassen theory will stand up in actual practice. Shipments of "nonstrategic" machinery and of surplus food like dairy products and wheat could result in the toughening up—not the undermining—of Communism, it's pointed out.

Administration experts reason that satellite countries must count on Russia to fill their economic needs, and the U. S. could woo the satellites by filling some of these demands. But this point of view does not acknowledge that Russia drains from its "colonies" what it wants, gives little back in return, and soaks off the labels on gifts from the U. S.

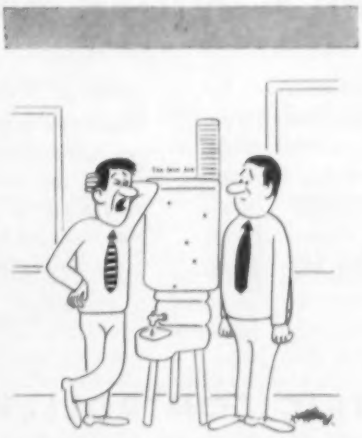
Czechs Need Machinery . . . Czechoslovakia, for example, is in desperate need of new machinery to raise the efficiency of its plants. But the Reds ignore the Czechs pleas, for all machinery is needed in Russia. So the Czechs simply do without, or patch up what they have.

Similarly, shipments of U. S. food might or might not get into the hands of the hungry. Would hungry Reds in satellite countries be told that the U. S. food shipped them was from the U. S.? Many congressmen doubt it.

What Price Coal? . . . Sky-high cost of reopening coal mines in time of national emergency would be a real shock to industry—and to the consuming public. Coal operators are pleading with the government to lend a hand in keeping the mines operating, or at least keeping them in standby condition.

Flooding, rotting timbers, corroded rail and electrical systems can make the cost of reopening an abandoned mine prohibitive.

Tom Pickett, executive vice-president of the National Coal Assn., is reminding mobilization chiefs that the coal requirements of a major war are enormous. He estimates about 650 million to 700 million tons a year would be needed in an all-out war. Today, soft coal production is running about 390 million tons a year. Production last year was the lowest since 1939. Productive capacity is slowly sinking below the safety mark, Mr. Pickett warns.



"Yep. I used to dream of getting the salary I'm now starving on."

Ban Delivered Pricing . . . Balance of congressional power in the coming fight to clarify the legality of delivered pricing now apparently rests with politicians who would ban the practice. Left-wing Democrats are in a good position to push through a bill being drafted by Sen. Estes Kefauver, D., Tenn., which would prohibit delivered pricing in any form.

At the same time, Sen. Homer E. Capehart, R., Ind., is ready to introduce again his bill making it crystal-clear that good faith permits the practice.

Key to the outlook is that the new chairman of the powerful Senate Judiciary Committee is Sen. Harley M. Kilgore, D., W. Va., who in the past has supported the Kefauver view.

Have What We Need . . . Data put out by the State Dept. notwithstanding, Sen. George Malone, R., Nev., says the 21 American republics can supply all of the strategic materials needed by the U. S. in time of war. Sen. Malone says all of the scarce and strategic materials certified by U. S. military men as "essential" in wartime can be found easily in the Western Hemisphere. Consequently, he feels there is no point in continuing to pay dollars and "tribute" to foreign allies that charge "holdup" prices.

OK Shipping Routes . . . National defense and commercial importance of 15 U. S. overseas shipping routes has been approved by the Maritime Administration.

Turn Page

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COMPARABLE LIFTING CAPACITY

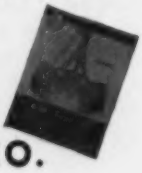
DISCHARGES LOADS QUICKER

NEW 45" MAGNET PROVIDES FASTER OPERATION OVER A WIDER WORKING RADIUS

This new magnet, developed by EC&M engineers, is the lightest weight magnet in the 45-inch size. High strength and watertight construction is maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding keeps pole shoes tight too.

Get the facts on this new EC&M type LSW magnet. Operators like the faster maneuverability . . . greater working radius, which permits more trips per day. The EC&M complete line of magnets includes 14 sizes, from 12-inches to 80-inches in diameter (the world's largest).

Write for Bulletin 900-L



THE ELECTRIC CONTROLLER & MFG. CO.

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The agency's declaration that these routes are essential is necessary in consideration of subsidy awards to U. S. flag operators who agree to maintain specified services on the routes.

Within a short time, officials will make decisions on the essentiality of remaining routes and round-the-world service.

In the last previous review of trade routes, performed in 1946, essentiality of 31 routes and round-the-world service was established. The new review does not make substantive changes in trade route descriptions.

Controls:

Administration again seeking standby control powers.

The Eisenhower Administration, reversing an earlier decision, now intends to seek restoration of standby authority to control prices, wages, rents, and credit in case of a new war or emergency.

Congress intends to peer and probe carefully into this request. Control powers will not be voted hastily. Senate and House members got their first detailed look on how Ike views the nation's economic health this week. They will learn a lot more in the weeks ahead when both houses of Congress hold public hearings on the Administration's proposal to extend the Defense Production Act.

This law, which once contained broad powers, is due to expire June 30. At present, the Defense Production Act is limited chiefly to authority for allocating scarce materials.

Would Freeze Prices, Wages

As yet, form of the control power has not been set, although it is stressed that it will contain broad, nonspecific, authority for a freeze.

A bill to give the President power to invoke a 90-day freeze has already been introduced in the House by Democrat Rep. Abraham J. Multer of New York, but this is not an Administration bill or even a "trial balloon." This bill would permit a freeze on wages and prices at levels in effect not more than 30 days prior to the freeze.

Mobilization planning now underway at the Office of Defense Mobilization, according to a congressional source, is replacing earlier plans with a set of regulations for an attack and another set for long-range mobilization. Basis is review of earlier OPS, and OPA methods, modified or scrapped when necessary. One suggestion is that a set of local control regulations be furnished Civil Defense workers for use in post-attack recovery.

It will be six months to a year before ODM will have policies, regulations and necessary legislation to effect a "sensible" mobilization program.

The Administration decided to seek congressional action after attorneys told the President during a recent cabinet-level meeting that his general powers in an emergency are "fuzzy," and might be contested. As part of the plan of consulting Congress in any "marginal" area of action, it was decided to ask Congress to clarify the President's authority by specifically giving or denying him control powers.

Gas:

Federal Power Commission okays $80 million expansion.

A compromise plan between two competing natural gas transmission firms clears the path for a $80 million expansion of pipelines and storage facilities to serve the New York-New Jersey area by four interstate pipeline companies.

Federal Power Commission, after 84 days of hearings, is permitting Tennessee Gas Transmission Co., and Transcontinental Gas Pipe Line Corp., both of Houston, Tex., to increase deliveries to six utility companies in the New York-New Jersey area.

Underground Storage

Under the plan, Transcontinental will spend $29.7 million on 173 miles of 30- and 36-in. loop line and 58 miles of 12- and 16-in. line. Tennessee will spend $28.7 million for 243 miles of 24-in. pipe from the Hebron storage field in Potter County, Pa., to existing facilities near Greenwich, Conn., and 18 miles of 24-in. pipe to connect with the New York areas.

In addition, Tennessee is authorized to spend $14.6 million for underground storage facilities in cooperation with Iroquois Gas Corp., Buffalo, N. Y., and with New York State Natural Gas Corp., Pittsburgh.

FPC requires Tennessee and Transcontinental to complete their new facilities by Nov. 1.

Tighten Pricing Laws

Manufacturers will be required to make price discounts available to all distributors under a bill now being considered in the House of Representatives.

The bill, sponsored by Rep. Wright Patman, D., Tex., would prohibit a manufacturer from cutting prices for any reason unless he informs all customers that the same price or terms are available under the same conditions for a reasonable period of time.

It is similar to a recent Federal Trade Commission ruling that manufacturers may not, under the Robinson-Patman Act, give advertising allowances to one customer without making the same allowances available to competing customers.

How to Raise Capital

Information for small companies interested in raising expansion capital through stock sales is offered in a new government program.

Securities & Exchange Commission and the Small Business Administration are cooperating in an effort to familiarize small firms with SEC regulations applying to issuance and sale of stocks.

By agreement between the two agencies, SEC will:

(1) Provide SBA field offices with information on the applicable regulation.

(2) Prepare data on equity financing for inclusion in the SBA publications series.

(3) Take part in conferences and educational courses arranged by SBA for owners of small firms; and

(4) Supply SBA with information resulting from SEC studies of small companies' securities issues.

H. K. PORTER COMPANY, INC. is mighty proud to announce, at this time, the newest member of its growing family . . . THE RIVERSIDE METAL COMPANY, Riverside, N. J.

As you probably know, The Riverside Metal Company is the world's largest manufacturer of Phosphor Bronze and a leading producer of Nickel Silver, Beryllium Copper, Cupro Nickel and other special alloys. The Riverside Metal Company, an outgrowth of its Keystone Watch Case Division, in 1953 celebrated its one hundredth anniversary.

What This Means to You

The acquisition of The Riverside Metal Company by H. K. Porter Company, Inc. means that Riverside will continue to give you the same top quality products, produced by the same skilled craftsmen by the most modern manufacturing methods. This has earned Riverside the enviable reputation of being the company to consult when alloy problems have you stumped.

We wish to take this opportunity to thank the customers of The Riverside Metal Company for their valued business and to extend to those they have not been privileged to serve, a most cordial invitation to avail themselves of the extensive facilities they will find at Riverside.

RIVERSIDE

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THE RIVERSIDE METAL COMPANY

Division of H. K. Porter Company, Inc.

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WEST COAST REPORT

Industrial Expansion Sets Fast Pace

New firms, mergers, expansions tell story of continued growth . . . Machinery, tools, electronics, aircraft, appliances, hardware plan more capacity this year . . . Shipbuilding contracts let—By *R. R. Kay.*

◆ FAR-WESTERN industrial fabric strengthens daily. New companies, mergers, expansions, and new contracts weave a consistent pattern of solid economic development.

Operatons are well-diversified and nicely spread over the area.

Sharp-eyed sales executives would do well to use this list as leads to pitch their metalworking products, equipment, and services. There's a big sales potential here.

Warehouse for Kaiser . . . Kaiser Steel Corp. plans a $1.2 million warehouse for pipe and structural shapes at its Fontana, Calif., works. . . . Utah Power & Light Co. is earmarking $18 million, and Southern California Edison Co., $76 million, for new construction this year. . . . Zidell Machinery and Supply Co., Portland, Ore., and Clyde Tube Forgings, Ltd., Glasgow, Scotland, formed Clyde Tube Forgings of America. The company will make welding fittings in a new plant on the Zidell property.

ElectroData Corp., Pasadena, Calif., manufacturers of automatic electronic digital computers, plans a $750,000 expansion by mid-year. Affiliate firm, Consolidated Engineering Corp., is considering a 60,000 sq ft increase for its Pasadena plant. . . . U. S. Steel Corp. purchased 14 acres of waterfront land next to its Pittsburg, Calif., plant, in addition to 450 acres to the east.

Will Repair Ships . . . Bowen-McLaughlin-York Corp., Phoenix, Ariz., road construction and ordnance rebuilding firm, bought Phoenix Auto Supply Co. . . . Seven government-owned merchant ships are scheduled for repair in San Pedro, Calif., and San Francisco Bay Area yards. Total cost of work will be about $1.2 million. And it is believed the aircraft carrier *Coral Sea* may wind up in Puget Sound (Wash.) Naval Shipyard for a $45-million modernization job.

Western Gear Works, Lynwood, Calif., has a second Navy contract, for roughly $1 million, for design, manufacture, and help in installing submarine cable-laying machinery. . . . Norris-Thermador Corp., Los Angeles, got a $3-million government contract for cartridge case production.

More Floor Space . . . Columbia Machine Works, Vancouver, Wash., added a 7500 sq ft warehouse. . . . Friden Calculating Machine Co., San Leandro, Calif., is enlarging its facilities 20,000 sq ft. Firm makes office machines. . . . Earle M. Jorgensen Co., Los Angeles steel distributors, bought Taylor & Spotswood Co., San Francisco steel distributors.

British Columbia Power Commission will construct a $9.7 million generating facility at Ladore Falls, Campbell River, Vancouver Island. Two 35,000-hp generating units are planned. . . . Mutual Steel Construction, Inc., was organized in Los Angeles as structural steel constructors. . . . Minneapolis-Honeywell Regulator Co. is buying a 44,000 sq ft lot in San Francisco.

"We're developing sound that travels faster than airplanes."

Sell Alloy Foundry . . . Pacific Alloy Engineering Corp., El Cajon, Calif., is buying the stainless alloy foundry operated by Solar Aircraft Co., San Diego. Pacific Alloy, a subsidiary of Pelton Steel Casting Co. of Milwaukee, plans to move into a new 24,000 sq ft plant. . . . Johnston Pump Co., Pasadena, Calif., sold out to Emsco Manufacturing Co., Los Angeles.

Baash-Ross Tool Co., Los Angeles, makers of oil and gas field machinery and equipment, sold out to Joy Manufacturing Co., Pittsburgh. . . . Hubbard & Co., Emeryville, Calif., spent a half-million dollars on a 40,000 sq ft addition.

New Firms Open . . . And these new metalworking companies are "open for business" in Portland, Ore.: Oregon Industrial Coil Springs Co.; "B" Line Mfg. Co. (tree trimming booms); Ardies Machinery & Sales (machine shop); and Acme Spinning Mfg. Co.. (metal spinning).

Southwestern Engineering Co., Los Angeles, will engineer and build a $4-million mining and metallurgical installation for National Lead Co., S. A., of Argentina. Construction on the project, located 900 miles from Buenos Aires near the Chilean border, will get going early this year.

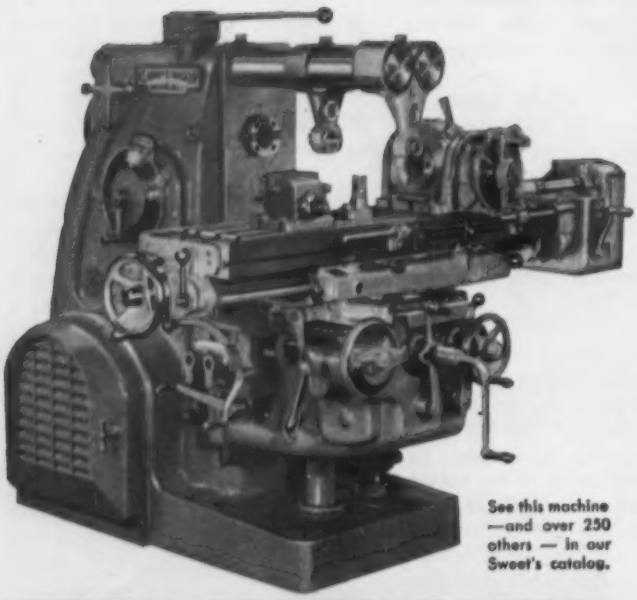
WOULD YOU SPEND 47½ CENTS PER HOUR...

for all the production you can get from this new 10 hp No. 2 Model CK universal milling machine? That's all it would cost you under

Kearney & Trecker

TOOL-LEASE

PROGRAM



See this machine —and over 250 others — in our Sweet's catalog.

HERE'S another popular knee-type universal milling machine, packed with outstanding design and operating features. It's available for your immediate needs under Kearney & Trecker's Tool-Lease program.

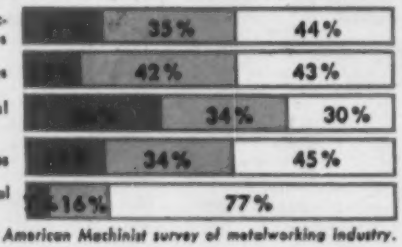
Under Tool-Lease Plan "A," one of three seven-year lease agreements offered by Kearney & Trecker, you make two semi-annual rental payments, totaling 25% of the machine's price during each of the first three years. Actually in dollars and cents, you pay 47½ cents per hour for this new 10 hp No. 2 Model CK universal milling machine. That means a machine installed in your plant and in operation — *literally for pennies an hour!*

What's more, under Tool-Lease, you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Special Industry Machinery — Includes machinery for food-products, textile, woodworking, paper industries, printing, cement-making, glass-making, incandescent lamp-making; paint-making, rubber-working, tobacco-products, shoe-making, and stone-working; smelting and refining equipment. Of the total 12,889 machines in use today which can be replaced by Tool-Lease equipment — 28% are over 20 years old, over 36% are 10 to 20 years old!



Figures adapted from 1953 American Machinist survey of metalworking industry.

KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.

Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."

Name.....

Title.....

Company.....

Address.....

City..... Zone..... State.....

MACHINE TOOL HIGH SPOTS

Tool Reserve Plans Taking Shape

Armed Services are shopping around for $100 million worth of tools; ODM is working elephant tool buildup; Defense Dept. is streamlining its tool reserve . . . Expect even more spending on tools—*By E. J. Egan, Jr.*

◆ GOVERNMENT OFFICIALS most intimately concerned with the condition of U. S. defense seem determined not to let it get paunchy where metalworking production capacity is concerned. Given enough time to work out their plans, Washington's policymakers could have a solid machine tool reserve stored away in strategic locations.

As of now, here's the way things shape up: (1) The Army, Navy and Air Force are shopping for $100 million worth of reserve tools and facilities (mostly tools) for approved emergency projects; (2) Office of Defense Mobilization is planning another and presumably adequate elephant tool reserve for quick, general-purpose availability; (3) Defense Dept. is weeding out obsolete items from the hodgepodge of metalworking equipment the Armed Services acquired during and after World War II.

All three programs are out of the pencil-gnawing stage. They're definitely headed toward a common objective, a hard core of machine tools in good working order and in sufficient number for any sudden defense emergency.

Must Spend It Quick . . . The military services are trying hard to commit their shares of an initial $100 million "Vance Plan" appropriation before the 1955 fiscal year ends this June. It won't be any problem for the Army and Navy; they're only splitting about 15.5 million between them. Air Force has the toughest job, to spend almost $85 million as usefully and quickly as possible.

The money doesn't have to be committed within the next 6 months, but psychologically it might be the best thing to do.

It was expected that Congress would get a polite request from the military for another $100 million to push the Vance Plan ahead still more. The item was scheduled to be in the President's annual budget message, and approved projects to spend the money on are already on tap.

Defense officials are optimistic that Congress will grant the money, especially if it can be shown that every dollar of the first $100 million is being made to count.

Still Surveying Tools . . . ODM's elephant tool reserve program is still looking for a foundation on which to build. No one knows for sure how many and what type super-size tools will be needed. Business & Defense Services Administration's Metalworking Equipment Div. is trying to furnish the answer. It sent questionnaires to plants across the nation, will add up the score on privately owned elephant tools and their emergency availability.

Meanwhile the Defense Dept. continues to inventory thousands of machine tools the armed forces acquired over many years. It's correcting faulty records and disposing of unsuitable equipment without depressing new or used machine tool markets. What is finally retained should be a well classified, accurately located and invaluable equipment reserve.

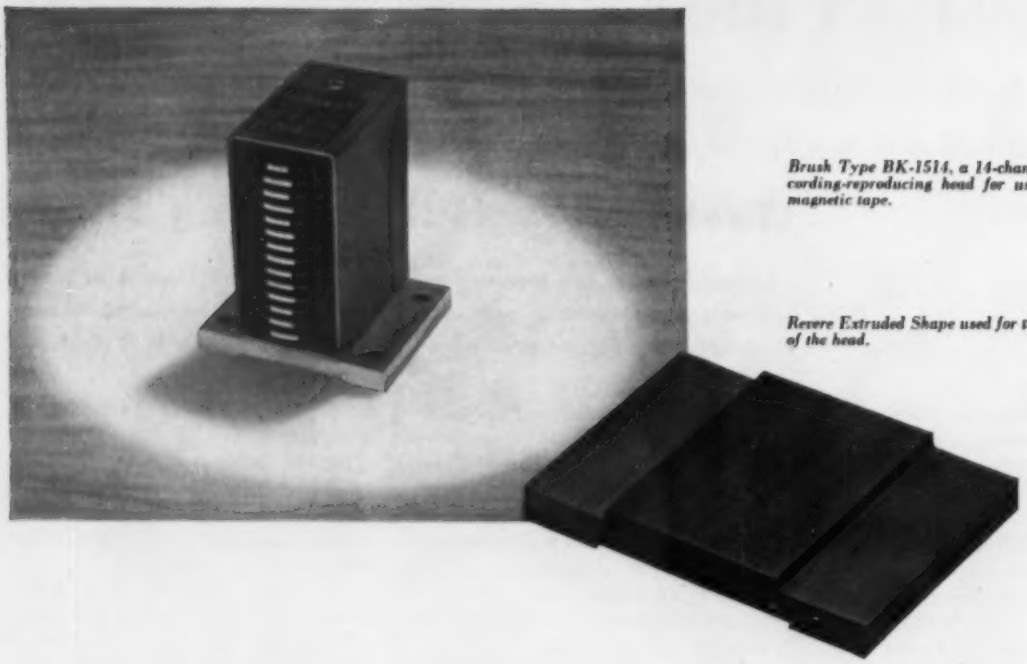
"He carries things too far, him and his college degree."

Inexpensive, Effective Selling . . . Modern Tool Works, Ltd., Toronto machine tool builder, has worked out a successful, inexpensive system for selling special purpose equipment.

The Canadian firm doesn't have the large market and long experience of many of its American competitors, can't always produce photos and testimonials for similar equipment to that which they propose to furnish. So they have an industrial artist in their estimating department prepare a carefully shaded, almost photographically detailed drawing of the final machine as they picture it.

Cut-a-way and scrap views show all machine features. Proposals also include a full explanation of sequence cycles, time breakdown and estimated production. From this amount of preparation, costs are figured with a minimum of "guesstimating."

The time and trouble required in preparing these pictorial estimates has cinched many a sale.



Brush Type BK-1514, a 14-channel recording-reproducing head for use with magnetic tape.

Revere Extruded Shape used for the base of the head.

Revere Extruded Shape

Saves 15¢ per piece

For Brush

The base of the magnetic recording-reproducing head shown here is a Revere brass extruded shape. You can see that it is rather simple in design, yet Brush Electronics Co., Cleveland, Ohio, reports that the shape saves 15¢ per piece (1½" long) over the previous method of milling the piece out of solid bar. There were three operations required on the bar, which weighed 1.61 lb. per foot, against 1.22 lb. per foot for the shape. Eliminating the machining operations, and reducing scrap almost to the vanishing point, produced the economy.

The head in question can record and reproduce signals from 14 channels, at frequencies within, below, or above the audible range. Such a head is being increasingly employed to handle information to be used for computation, telemetering, inventory records, process control (automation) and similar purposes.

Extruded shapes by Revere should be looked into if you are doing any extensive machining of raw stock in copper and its alloys, and aluminum alloys. The extrusion process is much like squeezing paste from a tube. Much more intricate shapes than the one shown here are possible. Naturally, all design lines must be parallel to the axis of extrusion. Get in touch with the nearest Revere Sales Office, and see if Revere Extruded Shapes may not save you money.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere.

The Iron Age SALUTES

Frederic O. Hess

He made a short trip to the U. S. 30 years ago "to get some experience" and stayed on to become one of the nation's foremost industrial gas equipment and heat treating engineers.

A gas flame becomes a precision tool in the hands of Fred Hess, president of Selas Corporation of America, who has devoted his professional life to solving some of the toughest problems in metalworking by the controlled application of heat.

Last year the Gas Appliance Manufacturers Assn. made its first annual Distinguished Service Award to Fred, with the following citation: "In recognition of his distinguished, unselfish service and notable contributions in the field of industrial gas research design and utilization, and his assistance to government in the public interest; all of which has resulted in the continued advancement of the Industrial Gas Industry."

Typical of the many problems Fred has tackled and solved is that of the onion canner who came to him seeking to eliminate the messy, tearful and time-consuming operation of peeling onions by hand. Selas Corp. engineered a unit to sear off the onion skins automatically at the rate of six tons per hour.

About 20 years ago Fred was instrumental in effecting a time saving in the process of fine printing on glossy paper. In cooperation with ink manufacturers, paper mills and press builders Fred developed a heating process that would dry ink rapidly and speed up the printing run from 300 to 1200 ft per minute without lowering the top quality results.

Fred came to America in 1924 as a young engineering graduate from Germany seeking technical experience. With only slight command of English he went to work in a Hartford, Conn., ball-bearing plant. A year or so later, as foreman at the Hartford Machine Screw Co., he accepted an offer from Selas' management to help design a new line of products.

When Fred joined Selas the firm had but six employees, and was doing $35,000 worth of business yearly. Today there are 500, of whom 100 are design engineers, and the company's net sales have climbed above $5.5 million.

Weekends the year 'round find Fred and Mrs. Hess at their home at Skytop in Pennsylvania's Pocono Mountains where they both enjoy golf, skating and skiing in season.

Here a Cincinnati Press Brake saves 3 ways...

Built at The Maryland Drydock Company, for the Westinghouse Electric Corporation these giant condensers are some of the largest ever constructed.

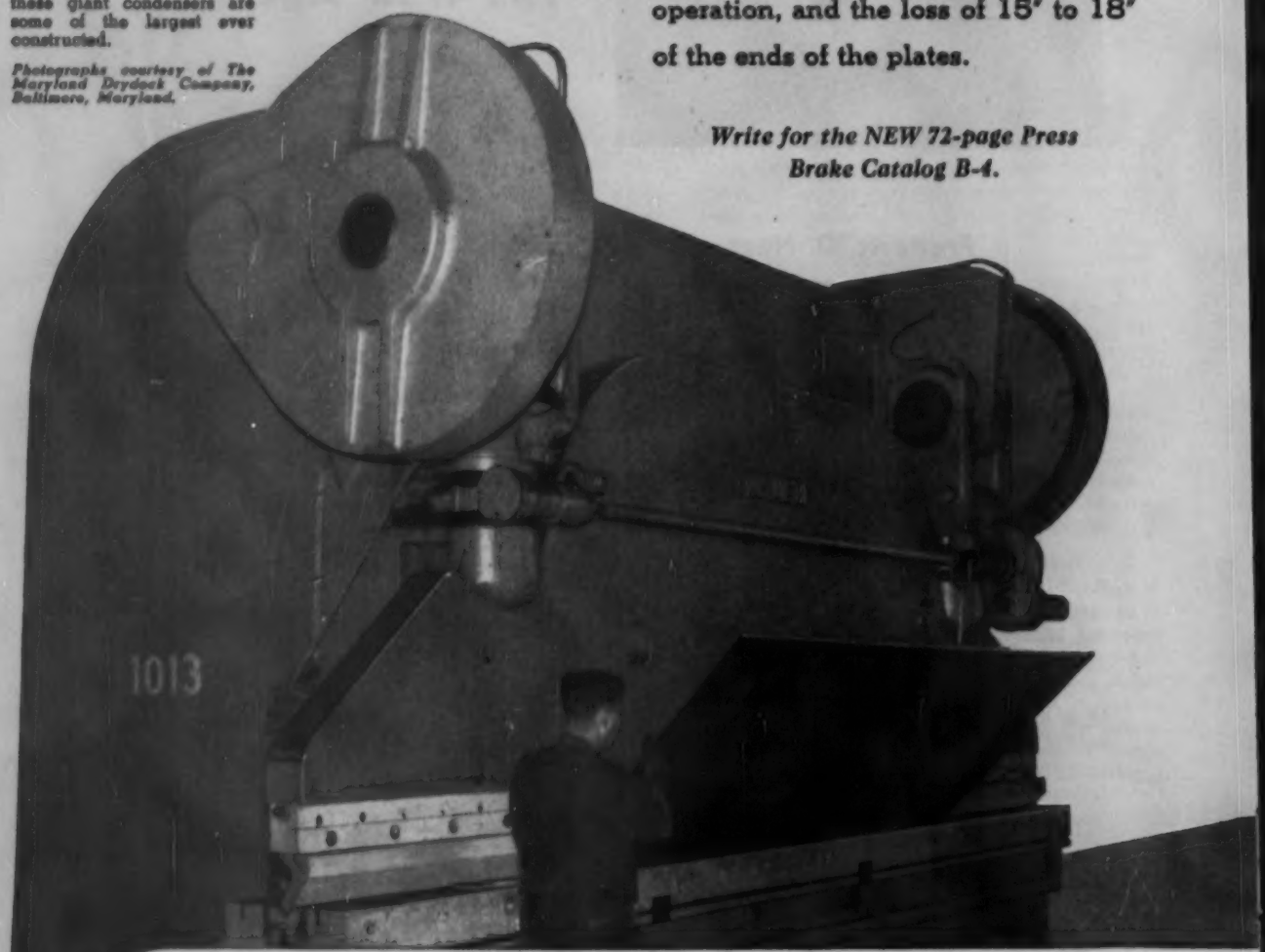
Photographs courtesy of The Maryland Drydock Company, Baltimore, Maryland.

- TIME
- NUMBER OF OPERATIONS
- MATERIAL

Crimping plate up to 3″ thicknesses has cut roll-forming time in half at The Maryland Drydock Company.

The press brake crimps the ends of the plates with special dies, and has eliminated both the costly burning operation, and the loss of 15″ to 18″ of the ends of the plates.

Write for the NEW 72-page Press Brake Catalog B-4.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

The Iron Age INTRODUCES

EDWIN O. BURGHAM, elected president, Weirton Steel Co., Pittsburgh.

Charles T. Everett, elected president and general manager, as well as a director, **Beaver Pipe Tools Inc.,** Warren, Ohio.

A. A. Mathewson, appointed assistant to the president, **Borg-Warner Corp.,** Petro-Mechanics Research Div., Chicago.

R. F. Allen and **C. I. Young,** named vice-presidents, Lacklede-Christy Co., division of **H. K. Porter Co., Inc.**

Richard O. Loengard, appointed vice-president, **Metal & Thermit Corp.,** New York.

Philip F. Thayer, appointed vice-president, **General Metals Corp.,** and general manager of its Metals Div.

Willis J. Wenger, appointed assistant vice-president, Roll Dept., **Continental Foundry & Machine Co.,** Pittsburgh.

George M. Hohmann, named vice-president in charge of production, **Alloy Rods Co.,** and **E. R. Walsh, III,** appointed vice-president in charge of sales.

Harold E. Hasemeyer, appointed vice-president in charge of production, **The Electric Auto-Lite Co.**

Harold J. Holmes, becomes assistant to the vice-president, Engineering, **Heald Machine Co.,** Worcester.

Wilfred R. Riggs, Jr., becomes assistant director of general planning, **Kaiser Steel Corp.;** and **Robert H. Howard,** appointed supervisor, general planning.

Charles Stiassni, elected treasurer, **White Metal Mfg. Co.,** Hoboken, N. J.

Dr. Franklin E. Lowance, appointed director of research and engineering, **Westinghouse Air Brake Co.**

J. Bruce Butler, elected chairman and head of the **Mississippi Valley Structural Steel Co.**

Roy P. Williamson, appointed director of sales, **The Morgan Engineering Co.**

James H. Lowe, becomes director of product development, **Keokuk Steel Casting Co.,** Keokuk, Iowa.

Willard M. Mobley, appointed technical director, Technical Control and Research Dept., **Alabama By-Products Corp.**

Robert D. Smith, appointed general manager, Credit and Collection Dept., **Republic Steel Corp. Arthur W. Jones** and **Arthur J. Collins,** appointed assistant credit managers.

Dr. William H. Schuette, promoted to assistant to the general manager, Midland Div., **The Dow Chemical Co.**

DAVID H. BOYD, elected president, Union Supply Co.

PAUL E. SHROADS, elected senior vice-president, National Steel Corp., Pittsburgh.

MICHEL E. PUYANS, elected vice-president finance, Great Lakes Carbon Corp., New York.

Charles Ritter, becomes assistant to the general manager of sales, **Edgcomb Steel Co.,** Philadelphia.

R. C. Ochs, named assistant general manager, Axle Div., **Eaton Mfg. Co.**

P. W. Wyckoff, named chief engineer, Airtemp Div., **Chrysler Corp.,** Dayton.

E. F. Nason, named administrative assistant, **Elastic Stop Nut Corp. of America.**

Glenn Middleton, becomes consultant, Los Angeles area, **Exothermic Alloys Sales & Service, Inc.**

John J. Dixon, becomes chief engineer, **Duff-Norton Mfg. Co.** He succeeds Frank H. Schwerin who is retiring after 36 years with the company.

L. E. Simon, promoted to chief process engineer, Electro-Motive Div., **General Motors,** La Grange, Ill.

Carl Seguin, appointed process engineer in charge of cost reduction, **Robertshaw-Fulton Controls Co.**

Richard Page, appointed chief inspector, Fabricating Div., **Plume & Atwood Mfg. Co.**

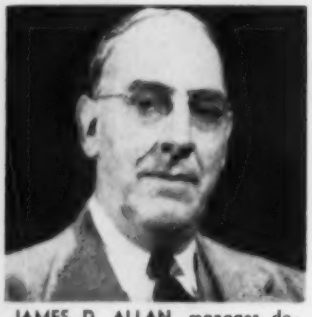
Russell L. McKinley, appointed field service manager, Construction Machinery Div., **Clark Equipment Co.,** Benton Harbor, Mich.

John J. Warso, promoted to general sales manager, **Youngstown Mfg., Inc.**

Alan G. Grey, appointed manager of structural and bar sales, **Kaiser Steel Corp.**

McCLURE KELLEY, promoted to executive vice-president, Baldwin-Lima-Hamilton Corp.

WEAVER E. FALBERG, appointed general manager of sales, Joseph T. Ryerson & Son, Inc.



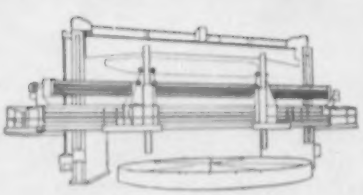
JAMES D. ALLAN, manager domestic machinery sales, Pratt & Whitney, will direct the Machinery Sales Div., Niles-Bement-Pond Co.

M. T. O'DONNELL, appointed special assistant to the president in charge of manufacturing and organization divisionalization, Chrysler Div., Chrysler Corp.

LET SIMMONS REBUILD AND MODERNIZE YOUR BORING MILLS

Investigate the important production, maintenance and tax savings of SIMMONS ENGINEERED REBUILDING for your: Lathes, Planers, Surface Grinders, Cylindrical Grinders, Vertical Millers, Openside Planers, Automatics, Vertical Boring Mills, Turret Lathes and Radial Drills.

A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1721 North Broadway, Albany 1, N. Y.



Write for Simmons Way... case histories of rebuilding jobs.

SIMMONS MACHINE TOOL CORP., 1721 North Broadway, Albany 1, N. Y.

Unconditional guarantee... our standard since 1910

Each COR-TEN Steel container is equipped with air intake and air relief valves, and receptacles containing a desicant, which dehumidifies the trapped pressurized air to the low relative humidity that will prevent corrosion or fungus attack to the contents.

How USS COR-TEN Steel containers for military aircraft engines help save U. S. Government millions of dollars yearly

DURING the past ten years the U. S. Department of Defense has developed a new concept in the field of packaging that has vitally strengthened our military preparedness.

It consists of the use of pressurized, shock-proof steel containers for the vibration-isolated shipping, handling and storage of aircraft engines, both reciprocating and jet types.

Because these containers must be stored in air bases all over the world and are frequently transported by air, basic design requirements call for lightness coupled with high strength and corrosion resistance.

In USS COR-TEN Steel, the Baltimore Steel Company, Baltimore, Md., a producer of such containers, has found the most satisfactory material and the most economical from the cost standpoint.

By replacing carbon steel with USS COR-TEN Steel, which is 50% stronger, weight has been reduced appreciably—with no loss of container strength and at a cost comparable to mild steel. The result—a lighter, stronger finished product that has the added benefit of higher atmospheric corrosion resistance—4 to 6 times that of carbon steel. Thus the engines, shipped undamaged in these COR-TEN Steel containers, *stay* factory-new and instantly available, regardless of temperature, climate or length of storage. What's more, experience has shown that COR-TEN Steel containers are re-useable again and again with a minimum of maintenance.

As to the savings they assure, note this: The U. S. Navy reports that over a 5-month period in 1947, the loss due to corrosion and damage of engines in ordinary non-metal containers was $4,750,000. But in 1952, over a similar 5-month period, for the same number of engines in steel containers, such loss was reduced to a mere $1,750.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS COR-TEN HIGH Strength STEEL

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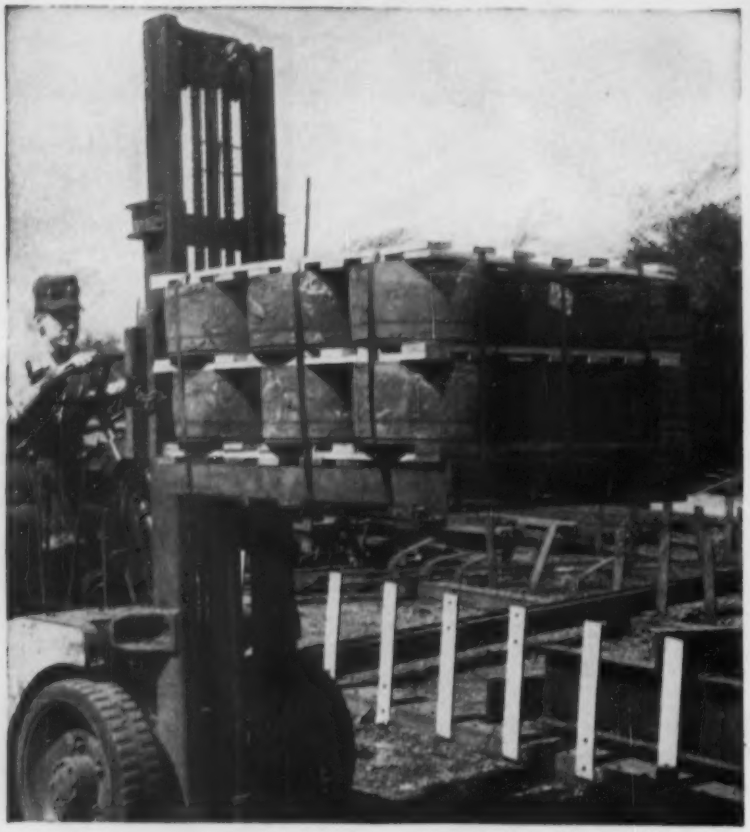
UNITED STATES STEEL



Signode unitizing method speeds truck handling of heavy castings

A manufacturer in Alabama sought a safer, lower cost way to ship heavy-wheel castings by motor truck to Michigan. With the co-operation of Signode's fieldman, a special unitizing pallet pack was developed. First, a heavier, stronger pallet was built. Two layers of castings, separated by a wood frame, and similarly capped, were strapped to the pallet. Six bands of Signode steel strapping, spaced for maximum unitizing efficiency, were applied. The new method of shipping saved time in loading and unloading. Handling safety was greatly increased. Cost of the pallets was self-liquidating, because the receiver bought them for inplant handling and storing of castings, and for intraplant shipping.

Get in touch with your Signode Fieldman! He will be able to show you, too, how to make important savings in packaging, handling and shipping your products through the six basic unitizing methods. Quickest way to reach him is to write

SIGNODE Steel Strapping Co.

2622 N. Western Ave., Chicago 47, Ill.
Offices coast to coast—Foreign subsidiaries and distributors world-wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

PERSONNEL

Edwin S. Karlow, appointed plant credit manager, **The National Supply Co.,** Industrial Products Div., Torrance, Calif., plant.

John C. Moroco, promoted to master mechanic, Roemer Works, **Sharon Steel Corp.; Leonard F. Weldon,** promoted to assistant master mechanic, Roemer Works; **Donald N. Richards,** becomes assistant to the master mechanic; and **John V. Fischer,** becomes hydraulic and lubrication engineer. **James Wilson,** promoted to foreman of the combined pipe shops.

James S. Hubbard, becomes sales manager, Boston office, **Wyandotte Chemicals Corp.,** and **Charles J. Martin,** becomes sales manager, Buffalo office.

W. H. Gibbons, Jr., appointed assistant manager, Houston, Tex., district sales office, **Republic Steel Corp.**

Alfred B. Kerber, appointed field representative, **Peter A. Frasse and Co., Inc.**

OBITUARIES

E. Franklin Motch, 46, president and treasurer, **The Motch & Merryweather Machinery Co.,** Cleveland.

Donald F. Grace, 52, vice-president and secretary, **Chicago Steel Service Co.,** Chicago.

K. P. Chinn, 61, retired assistant executive vice-president, **Southern Pacific Lines,** Texas and Louisiana, recently.

R. Verne Mitchell, 69, honorary chairman of the board, **Harris-Seybold Co.,** Cleveland.

Harry W. Trump, 63, southwest district manager, Industrial Division, **The Timken Roller Bearing Co.,** recently in Dallas.

SARGENT of New Haven reports a

50% reduction

in machining and polishing through shell molding and

GENERAL ELECTRIC SHELL RESINS

Here's a report on shell molding with General Electric shell resins from Sargent & Company, New Haven, Conn.:

"Shell molding with G-E shell resins has proved ideal for producing parts for our new line of 'Quick' Exit Devices. The shell process permits the use of hard, high-grade bronze—resulting in a completed product unsurpassed in finish and texture."

Machining, polishing operations cut in half! "Parts are *sounder*—have more uniform grain structure. They're *smoother*—free from surface gas holes. *Machining and polishing operations were reduced by 50%*. Over-all result: a product better in both strength and appearance, produced more quickly and easily, with faster deliveries so important to sales."

Sargent uses three General Electric shell-molding products to turn out "Quick" Exit Device parts: **G-E 12374 phenolic shell-molding resin** to form light, dimensionally accurate molds, **G-E SM-55 silicone parting agent** to secure quick, easy release of molds from patterns, and **G-E 12316 bonding resin** to cement shell halves together.

FREE BOOKLET AVAILABLE

How can shell molding help YOU? General Electric, a major supplier of molding and release agents for the shell process, has prepared an informative 28-page manual telling about the techniques and benefits of this new foundry method. *Just mail the coupon for a free copy!*

SEND COUPON TODAY FOR SHELL-MOLDING DATA!

General Electric Company
Section 2418-48, Chemical and Metallurgical Division
Pittsfield, Massachusetts

Please send me a free copy of *G-E Shell Molding Manual.*

☐ We are presently using the shell-molding process.
☐ We are interested in the shell-molding process.

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Progress Is Our Most Important Product

GENERAL ELECTRIC

Seven years service for STANOIL *Industrial Oil at David Bradley Mfg. Works –No down time for lubrication*

L. R. Cummings (left), Standard lubrication specialist, inspects sample of STANOIL, with Robert C. Menken, Plant Engineer of David Bradley Manufacturing Works. Larry Cummings has been serving industrial customers for Standard Oil since graduation from Standard's Sales Engineering School. His mechanical engineering degree from Tri-State College of Indiana qualified him for this work. Customers of Larry's find this experience and background pay off for them.

David Bradley Tri-Trac, handy piece of farm equipment, gives farmer new opportunity for mechanization at low cost. Upper frame on which gasoline tank is mounted, is part formed in HPM press.

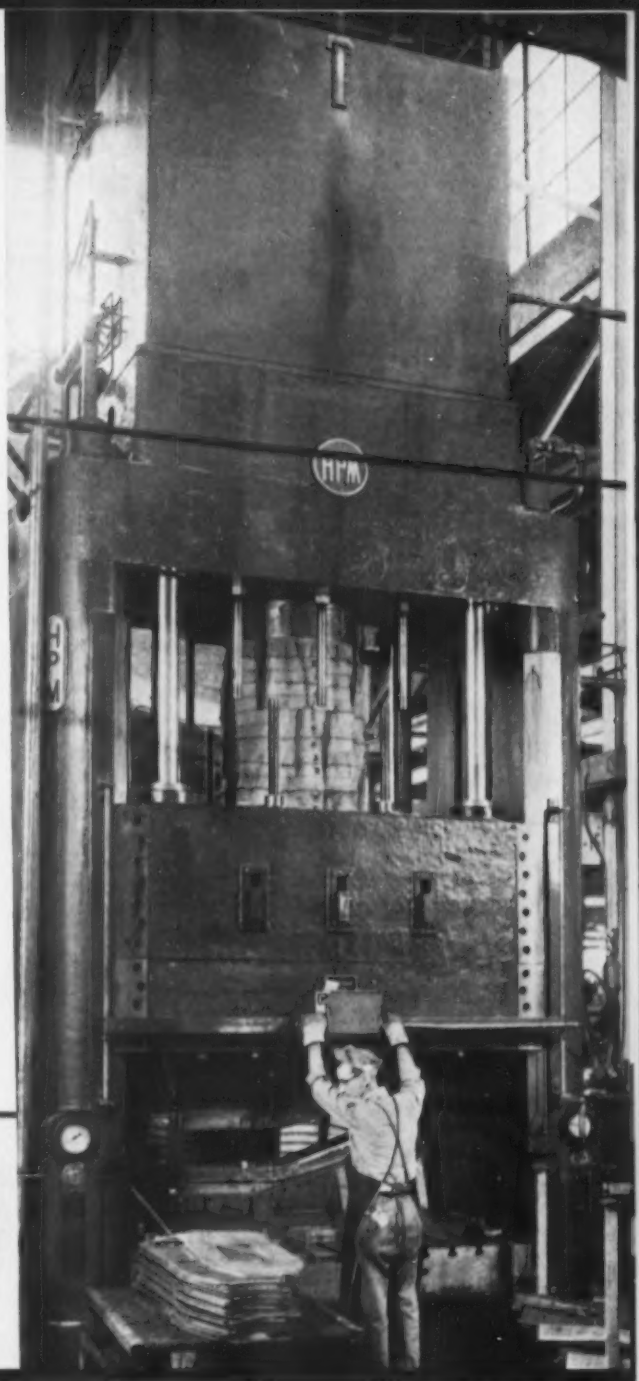
Seven years ago, David Bradley Mfg. Works installed 900 gallons of STANOIL Industrial Oil in an HPM press. There's been no down time required for lubrication maintenance since. A pump by-pass screen filter is the only filtering the oil receives, yet the system continues clean. In March, 1954, an analysis of the oil showed:

Viscosity @ 100°F.—980
Color, NPA — 6
Neutralization No.— .11

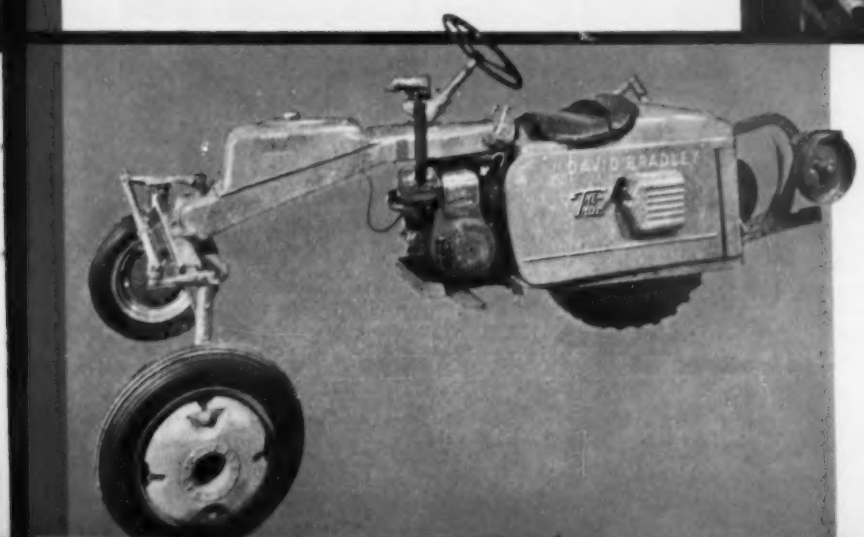
STANOIL Industrial Oil has long been at work for Bradley. Successful operations with it in other equipment caused Bradley engineers to specify STANOIL for this installation.

The HPM double acting, fast traverse hydraulic press reported on here is used to draw the upper frames for the David Bradley Tri-Trac, compact farm tractor. The Tri-Trac is the newest implement in the Bradley line. Bradley has been making farm implements since 1832.

Like to know more about STANOIL? Perhaps it can serve you as efficiently as it is serving David Bradley. Lubrication specialists in any Standard Oil office will be happy to help. In the midwest, a call to one of them will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

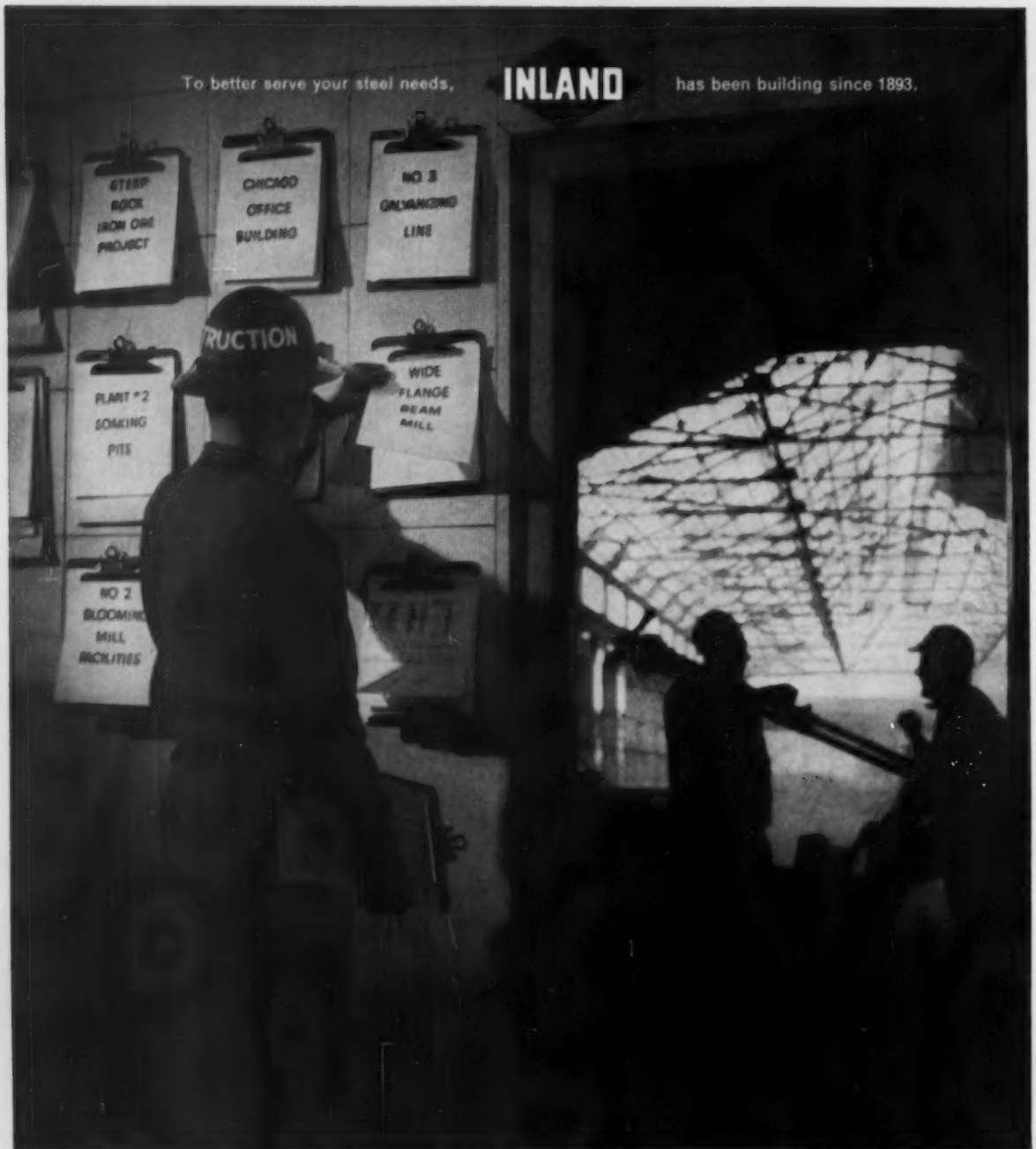


HPM 500-ton press on the upstroke after drawing upper frame for David Bradley Tri-Trac. Hydraulic system remains clean after 7 years service using STANOIL.



STANDARD

STANDARD OIL COMPANY
(Indiana)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The Iron Age
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TECHNICAL ARTICLES

It's the windchill effect—

Arctic Regions Pose Tough Metallurgical Problems

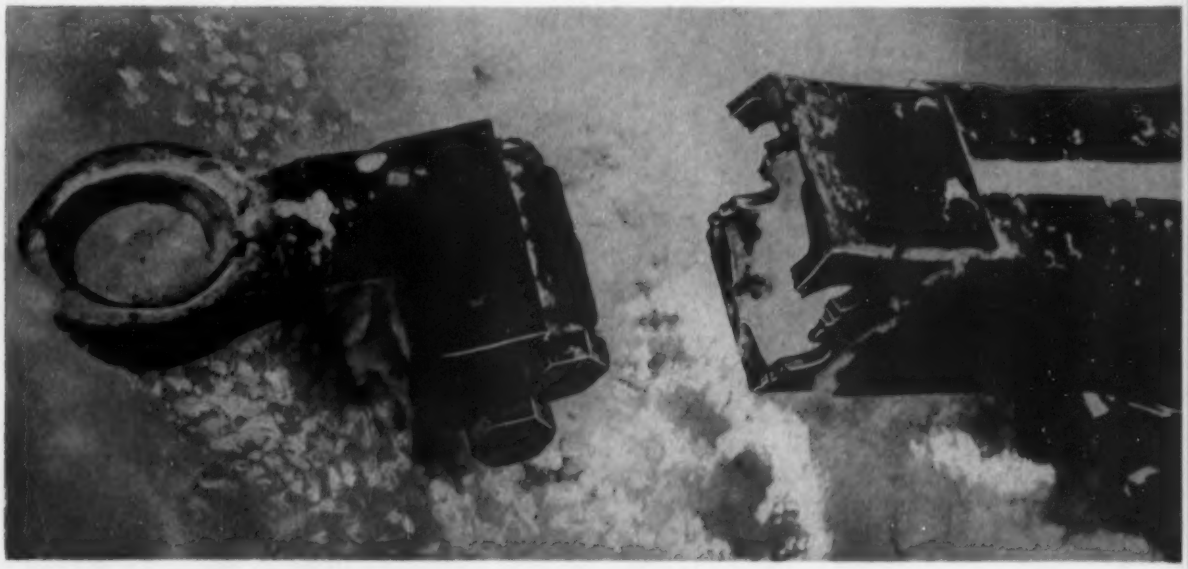
By MAJ. F. W. MYERS, JR., U. S. Army
Arlington, Va.

◆ Equipment built for use in Arctic areas is subjected to unusually severe ground conditions as well as extremes in weather . . . Metallurgical problems are compounded by an intangible "windchill" effect.

◆ Studies of metal failures show that the inadequacy of ordinary steels for low-temperature service is probably the greatest single factor responsible for such failures.

◆ ARCTIC REGIONS have assumed great military importance in recent years. To operate in such areas, equipment must be built to withstand extremely rugged conditions without metallurgical failure. It must endure temperatures ranging from 70° to −70°F, deep snow, marshland, ice-filled harbors and rivers, rough terrain and steep slopes.

Although much data on the failure of various metals at low temperatures have been developed, a great deal more must be developed to operate



TOW-BAR connection failed when the trailer was travelling empty. After repairing the fracture and travelling 12 miles, the entire tow-bar assembly parted from the trailer.

on a large scale in subzero temperatures. The problems encountered are not peculiar to any one mode of transportation or type of equipment.

One of the most outstanding examples of low-temperature metal failures is the more than 100 Liberty-type vessels and about 30 T-2 tankers which have been listed as casualties. The striking feature about these metallurgical failures is that these fractures occurred at about 30°F—a rather high temperature considering Arctic conditions.

During World War II, about half of the ships traveling to Murmansk, Russia, suffered metallurgical failures which weakened the main hull girder to such an extent that the vessel was lost or became unseaworthy.

In some Arctic land operations, metallurgical failures have occurred in stressed members on various types of equipment, including longitudinal frame girders in tractors, tow bars, pintle hooks, sled runners, and many other parts.

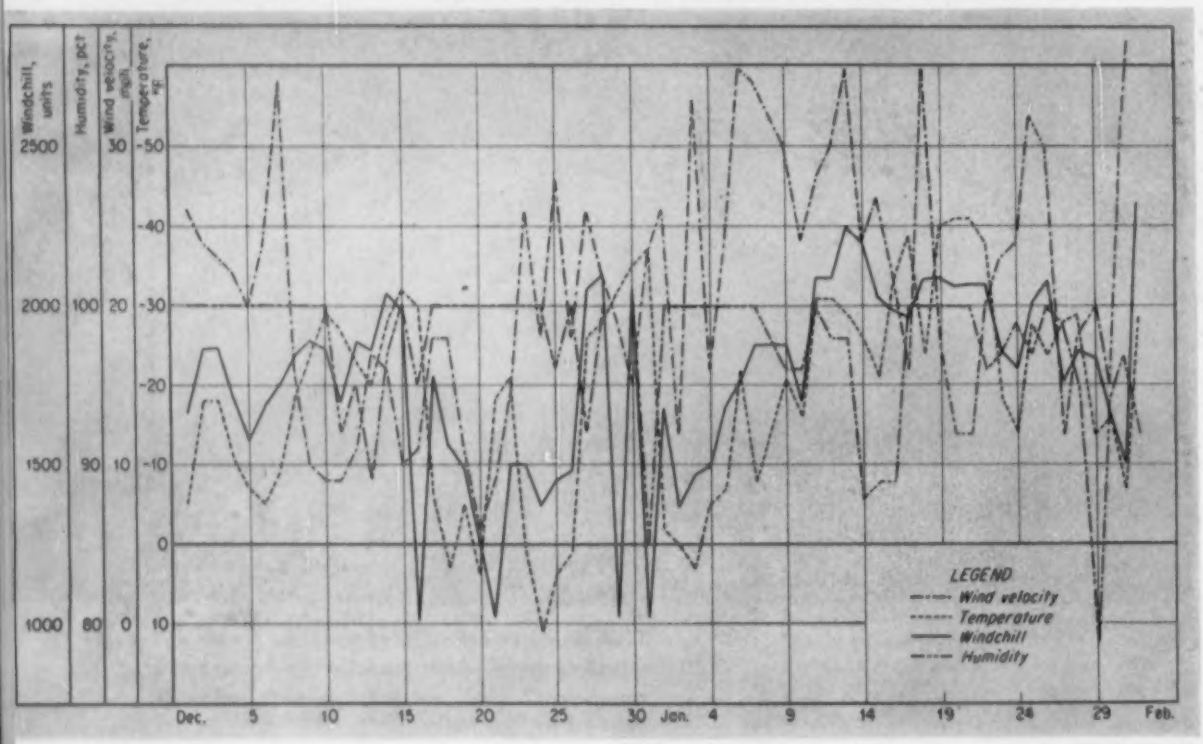
The problem is not unique to military equipment. The Canadian railroads, which have had considerable operating experience in extremely cold regions, have found it necessary to develop special steels to prevent undue breakage of locomotive frames, tracks and bridges.[1]

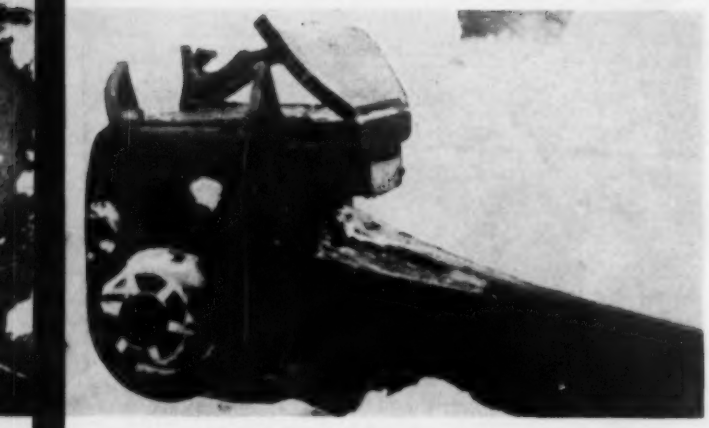
Another example of this problem is the number of welded bridges in Europe which failed in cold temperatures under relatively light loads. Investigations of these failures showed that al-

though design and shape of welded structures are important factors, the steels used must be suitable for low-temperature service. It also showed that the failures were directly attributable to the use of notch-sensitive steels.[2]

Metallurgical failures occurring in Arctic regions are complicated in analysis by an intangible "windchill" factor. It is defined as the rate at which an object loses heat if placed outdoors under given conditions. The unit used to measure windchill is the quantity of heat in kilogram calories per degree Centigrade which the atmosphere absorbs per hour from an exposed

TYPICAL CHART shows the variations in climate encountered in Arctic regions during a wintry two-month period. In addition to these conditions, equipment operates over rough terrain.





Left
FRACTURE of roller-rail on snow tractor is a good example of a cold-temperature metallurgical failure. It occurred at a temperature of about 20°F and a windchill factor of 1800.

Right
FAILURE of another type of tow-bar connection also indicates that ordinary steels are not serviceable under extremes of Arctic conditions.

surface one meter square. The highest windchill recorded in North America is about 2370 units.

The low-temperature problem is believed to be compounded substantially by this windchill effect. When the windchill sweeps in, on, or over a piece of equipment, it results in a quenching effect on the exposed surface, lowering the temperature of the material on the exposed surface below that of the unexposed side. Therefore, the material will have a temperature gradient through its cross-section.

This temperature differential sets up high multiaxial stresses, which together with load stress, results in early fracture of a strength member. If relatively good quality low-carbon steels fail at temperatures about 30°F, a steel having a much lower transition temperature will be required for equipment subjected to the additive destructive effects of windchill.

Study transition range effects

Research to date on metallurgical failures occurring at near zero or subzero temperatures indicates that these steels have had relatively high transition temperatures. This, coupled with inadequate design for welded construction, has been the major factor in ship failures. Even with good design, it has been the prime reason for structural failures in low-temperature areas.

Studies show that the transition range is raised by an increase in ferritic grain-size, an increase in plate thickness, and by slow cooling after normalizing. Also, the transition range in mild steel plate can be reduced by higher manganese content.[3] Other studies show that increasing the manganese:carbon ratio lowers the range of transition from tough to brittle fracture, increases the impact values at all temperatures, and tends to result in finer McQuaid-Ehn and ferritic grain sizes.[4] Still other tests show that chemical influence has a definite effect on transition temperature, and that metallurgical structure influences physical properties.[5]

Impact values drop with temperature

Some plates from ships which fractured were so lacking in toughness and so brittle at −40°F that they broke when dropped on a concrete floor. Some Charpy impact values of these steels were: deck plate at 70°F – 13 ft-lb, at 0°F – 5.8 ft-lb, at −40°F – 2.3 ft-lb; shear strake at 70°F – 8.6 ft-lb, at 0°F – 3.6 ft-lb, at −40°F – 1.6 ft-lb. Normalizing heat treatment about doubled the mechanical properties.

The many investigations show that most low-carbon hot-rolled structural steels have relatively high transition temperatures and are extremely notch sensitive at low temperatures. Changing structural design, combining riveted and welded construction, or other means of improvising will not alter this condition.

In many cases, failures have occurred at points of geometric discontinuity, which are structural notches, thereby setting up concentrations of stresses in or near a welded joint. Studies show that the weld was probably not the primary cause of failure. However, defective welds can set up stress concentrations resulting in fracture more readily in cold regions than in mild climates.

In each of several studies which included low carbon steels, the weld metal was more ductile than the base metal.[6] The most brittle zone was about 1 in. from the center line of the weld, or ½ in. from the edge of the heat-affected zone. Transition temperatures of the weld metals were −45° to −90°F lower than those of the base plate materials. Transition temperatures in the most brittle areas varied from −30° to −55°F.

Many lightweight alloys can be considered for use in Arctic regions. Aluminum, for example, not only greatly increases the payload of a vehicle, particularly where ground pressure is important, but gives a much higher safety factor to certain types of equipment. Aluminum alloys are superior to ferrous metals where notch-sensi-

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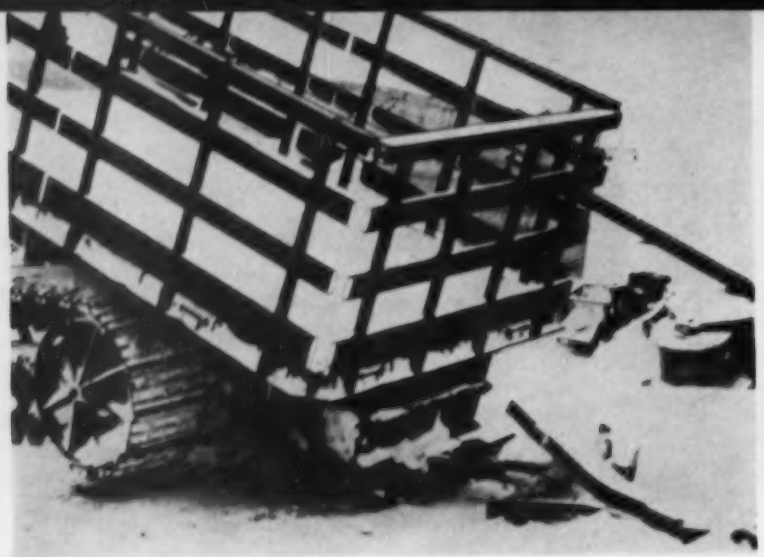
MAJOR MYERS, welding engineer, has done extensive research work in government service and as a member of technical committees. His articles have appeared in The Iron Age since 1946. His opinions do not necessarily reflect the views of the U. S. Army.



TWO 6-in. channels failed when this snow trailer was hauling a 3-ton payload. It had travelled only 6 miles when the breaks occurred.

tivity is important. Another advantage of aluminum is that its tensile strength increases with lower temperature while impact properties hardly change.

Magnesium has been used experimentally at temperatures as low as −320°F without difficulty. The modulus of elasticity of these lightweight metals is lower than that of steel, making it necessary to use deeper sections to maintain the same deflection characteristics. Conversely, this can be an asset because the lower the modulus, the greater the ability to absorb energy without permanent set.

High-tensile steels offer solution

Among the low-alloy steels, there are a number of high-tensile types which may be used successfully in relatively cold climates. These steels have a Charpy impact value of about 40 ft-lb and a tensile strength of about 70,000 psi. However, they do not have the toughness required at extremely low temperatures, −30°F and lower.

Use of the low-alloy high-tensile steels in ship construction may have definite advantages. Their higher cost would be offset by their higher physical values which would reduce the amount of steel required. It would also increase the payload of the vessel. Its greater corrosion resistance would be another factor in considering cost.

Low-carbon steels made by using fine-grain practice have also given results superior to those of ordinary steels.

High-manganese, high-tensile steel with small amounts of vanadium is another possibility for low-temperature service. Also, a fully-killed, hot-topped, 0.90 manganese steel which has an energy absorption value of about 50 ft-lb at −50°F and a yield strength of about 50,000 psi may give satisfactory low-temperature service.

Steels such as NE 8640 and SAE 4140 develop excellent low-temperature characteristics when given special heat treatments. After proper heat treatment, these steels exhibit yield strength of 105,000 psi and Charpy impact values of 50 to 60 ft-lb at −70°F. Microscopic segregation of alloying elements which tends to cause cracking in these high-strength steels can be greatly reduced by heating the steel to 2250°F.

For sled runner construction, some commercial materials combine high wear resistance with good mechanical properties at low temperatures. In heat treating these materials, the hardness is developed so as to provide a microstructure having excellent abrasion resistance.

Although much research work has been done to solve the many metallurgical problems associated with cold temperatures, there is still a great need for better construction materials and techniques. Such a program should include greater evaluation of the ferrous and nonferrous materials, development of better hard surfacing materials, and satisfactory application methods.

As for welding, there is no sound metallurgical basis for reports that this method of fabrication is unsatisfactory for structures which are to be subjected to Arctic temperatures. Welds made using correct techniques, proper joint designs, proper electrodes and conditions will produce joints at least as strong as the parent metal.

All studies and reports indicate that the vast majority of materials used in structures for Arctic use are inadequate for the job. The problems are such that they cannot be treated as failures of specific items or materials, but must be treated as a general metallurgical problem.

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Unit Loading, power Trucks Cut Foundry Handling Cost

◆ Power trucks have mechanized almost all material handling at Westinghouse Electric's Trafford foundry . . . They carry unit loads of raw materials, patterns and castings to all points of use.

◆ The three basic trucking methods involve skid-lift, pallet-fork and tractor-trailer equipment . . . Efficient planning requires only 18 battery-powered trucks to serve the entire plant.

By F. J. LYNCH, Field Engineer
Edison Storage Battery Div.
Thomas A. Edison, Inc., West Orange, N. J.

◆ INDUSTRIAL POWER trucking methods have gradually replaced virtually all manual handling operations at Westinghouse Electric Corp.'s giant Trafford, Pa., foundry. Mechanized handling unit loads of raw and finished materials is done by skid-lift trucks, pallet-fork equipment and a tractor-trailer system.

Wide diversification of the foundry's gray and ductile iron castings involves a variety of handling operations to which the unit load method has been successfully applied. All these handling improvements stem from a continuing modernization program which has been in effect for many years. One recent result of this program is a better method for handling and storing mold and core patterns and core boxes.

As the pattern inventory grew to its currently estimated 50,000 units, there were serious problems involved in storage and handling within the space available. And the difficulties tended to increase in almost direct proportion to the number of patterns on hand. All three industrial trucking methods were applied to these problems, chiefly by considering the size and weight of individual patterns. Other important considerations were space conservation, ready accessibility and minimum handling.

The initial approach to efficient pattern handling was based on the space-saving necessity of tiering as many large units as possible by means of 5000-lb high-lift fork trucks. It was clear that a large number of patterns were well within the size and weight capacity of such trucks. Their pattern cradles were accordingly provided with battens to give the necessary underclearance for fork-truck handling.

Heavy patterns in storage are now usually tiered 4 to 5-high and approximately to ceiling height. Tool numbers are clearly marked on their protective frames. Supplementary locator records are maintained in the foundry office and delivered to the molding operation whenever required.

Another group of patterns was too small for safe, practical tiering to ceiling height. Five-tier steel racks were installed to accommodate this group. Again each pattern cradle was battened to permit easy fork-truck pick up. Each cradle was also assigned a rack location numbered to correspond with the tool number marked on the pattern. This arrangement makes any pattern quickly accessible and speeds its return to the same location after use.

A third group of patterns was either too large or heavy for fork-truck handling. These are necessarily kept on the floor of the pattern-storage building and are handled there by a bridge crane. When needed by the foundry, they are hauled the 400 to 700-ft distance to the foundry floor by battery-powered tractor and heavy duty flat bed trailer.

This tractor-trailer system is also used to haul medium-sized patterns (usually several sets at a time) from storage to point of use on the

LIFT trucks expedite raw materials handling, carry many items from storage to point of use.

PROTECTIVE frames for tiered patterns are located by number, have fork underclearance.

LARGE patterns and core boxes move between storage and foundry by tractor-trailer train.

PLATFORM lift trucks carry unit loads of cores directly into the larger baking ovens.

AFTER shakeout, walkie trucks deliver skid bins of castings to tumble-blast machines.

UNIT loads of finished castings are shipped in these collapsible, returnable baskets.

foundry floor. There are large areas and correspondingly long distances involved between storage points and the various molding floors.

Patterns in the small-size group are stored near the molding lines and generally delivered by the same fork-lift trucks which handle them into and out of storage.

While the handling and storing of patterns and core boxes is the most recent power trucking improvement at the foundry, it is still only one of many. Earlier applications include (1) the receiving, storing and distribution of foundry supplies, (2) melt handling, (3) various handlings required in making cores, (4) carrying small castings from shake-out through cleaning to shipping, (5) disposal of slag and other waste material.

Trucks speed pouring

Most spectacular of these operations and certainly the one requiring the greatest continuity of truck operation is the handling of ladles of melt from cupolas to pouring stations. The main pouring floor is served by a craneway which brings ladles directly from the cupolas. But several outlying pouring floors rely wholly on industrial trucks to keep them supplied with melt. Of the 200 tons of 2800°F melt usually poured each day, approximately 60 per cent is handled by battery-powered truck. Molten iron is carried in 5000 and 6000-lb ladles.

Maximum dependability is essential in the melt-handling truck equipment. This requirement has been met successfully by the battery-type industrial trucks which have performed this job for approximately 12 years.

Another "hot" trucking job is the removal of slag pots from the five cupolas to an outside cooling and disposal area. Pots, which rest on steel skids under each cupola, are removed when full and replaced with empties as part of the normal trucking routine.

Material-handling operations for preparing, baking, assembling and distributing cores were among the first to be wholly mechanized by the application of power trucking. To start the process, full pallet loads of core-bonding compounds are delivered to sand millers by fork-lift truck.

The resulting mix is discharged into skid hoppers and carried to the core-making department by platform-lift truck. After forming, the green cores are accumulated on skid platforms or skid racks, depending on size, and carried inside gas-fired ovens by platform-lift truck.

At the end of the baking and cooling period, platform-lift trucks carry the unit loads of cores to either an interim storage area or to an assembly operation. As many as 12 different components may be used to assemble one core.

Skid-to-skid handling is used in this core-assembly operation. Skid loads of components are spotted within convenient reach of the assemblers at one end of the line. After assembly, the inspected cores are accumulated on empty skids at the opposite end. They are then carried by platform-lift truck to core-setting stations.

The bulk of the Trafford foundry's output is made up of relatively small items cast in large quantities.

These typical castings may be end caps, brackets and frames for Westinghouse fractional horsepower motors, or possibly crankcases, cylinders and cylinder blocks for air-conditioning units. Industrial power trucking is important to the handling operations for castings of all sizes. But its major applications are in handling the volume items produced on mechanized molding lines.

This is readily apparent in the casting, cleaning, sorting and shipping departments. Cooled castings are first separated from their molds at automatic "shake-out" stations. Conveyors discharge these castings directly into skid bins. The detached sprues and gates are sorted into other skid bins for return to the cupola remelt stockpile.

Skid bins of castings are carried to a cooling area. Depending on size and fragility, castings are then distributed either to automatic tumbling and shot blasting machines or to chipping and grinding benches. The work then progresses from one skid container to the next to eliminate needless manual rehandling.

After cleaning and final inspection all castings are accumulated in collapsible pallet-type shipping containers. These are picked up by fork-lift truck, weighed, tagged and tiered in finished storage areas adjacent to the shipping platforms. These containers allow rapid unloading at final destination. They are eventually collapsed, steel-strapped into unit bundles and returned to Trafford for re-use.

Equipment used efficiently

Despite the foundry's size and the variety of handling operations, truck use is so efficient that only 18 electric industrial units serve the entire plant. These consist of 5 low-lift platform trucks, 3 high-lift fork trucks, 1 tractor and 9 walkie type platform-lift trucks. They are powered by 31 Edison nickel-iron-alkaline storage batteries, ranging from 10-cell D4A's for the walkies to 30-cell C8's for the driver-ride trucks. All 18 trucks are used on the first shift but only 13 on the second shift.

Charging, watering and exchanging of batteries and all other truck servicing is centralized in the maintenance department where trucks return after each shift. Batteries are exchanged by power hoist and bridge crane. Battery servicing routine calls for solution level to be checked daily and necessary distilled water additions made by an Edison electric filler. Motor generators to provide power for battery charging are mounted on a balcony above the maintenance area to conserve space.

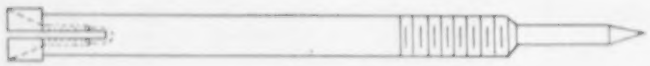
Simultaneous operations—

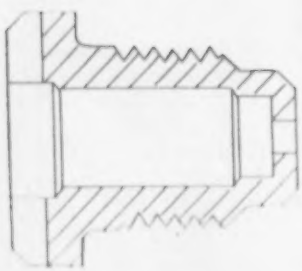
Milling, Drilling, Tapping Combined in Versatile Machine

BY J. L. RAYNIAK, Vice President, Manufacturing
Johnson Motors Div., Outboard Marine & Mfg. Co., Waukegan, Ill.

◆ Simultaneous milling, drilling, and tapping of small parts, plus elimination of handling operations and separate machining setups, have helped reduce manufacturing costs on outboard motor parts.

◆ Parts are hand loaded in clamping fixture type dials . . . Versatility of the equipment and ease of setup permit its use for relatively short runs . . . The dial fixture uses cam locking devices automatically actuated by air cylinders.





PARTS PROCESSED include, top to bottom, high speed nozzle, needle valve, float valve seat.

◆ REDUCED HANDLING and the combination of milling, drilling and tapping operations in one machine have permitted the Johnson Motor Div. of Outboard Marine and Mfg. Co., Waukeegan, Ill., to reduce manufacturing costs on a number of small parts.

Formerly, many of the operations were performed by hand on single spindle machines. Chief problem in changing to a new method was that the small quantities of individual parts required did not justify a large capital expenditure for special automatic equipment. A solution was found in a standard Bodine automatic multi-spindle machine. Flexibility of the machine permits it to be tooled to handle a range of parts without excessive changeover time from part to part. Small runs can keep the machine busy and justify the capital investment.

Three parts were involved: A series of needle valves, a series of high speed nozzles, and a series of float valve seats, all used in outboard marine motors. The parts are similar in size, so that it was feasible to produce them on a single size machine, in this case a Model 41-20 drilling, milling, and tapping machine.

The needle valves, ¼ in. in diam, appear in 11 sizes ranging in length from 2½ to 4½ in. Operations consist of drilling a number 36 hole,

AIR CYLINDERS automatically clamp and unclamp needles in this clamping fixture-type dial.

OPERATOR LOADS needle valves into fixture with right hand while unloading with left hand. Parts are clamped, processed, unclamped automatically. Production rate: 750 per hour.

11/16 in. deep; countersinking the top of the hole to a 25° included angle and to a 7/32 in. diam; tapping the hole with a 6-32 NC-2 thread, 9/16 in. deep; and milling an 0.035 in. slot, 11/16 in. deep, down the center axis of the drilled hole.

The dial equipment designed to handle this part is of the clamping fixture type. These fixtures consist of one stationary jaw and one moveable jaw which is actuated by an eccentric cam. The needle valve is dropped between the two jaws, and the eccentric cam is actuated by an air cylinder to clamp the piece securely in position.

Sequence of operations is to drill the No. 36 hole in two steps, countersink the hole, mill the 0.035 in. slot, and tap the hole with a 6-32 tap. Each dial fixture carries two hardened, ground pickup pins, which locate a drill jig carried on the first spindle, to accurately guide the drill and keep the drilled hole concentric with the outside diameter of the needle valve. It was necessary on this setup to guide only the first drill, since the second drill and countersinking tool could pick up the first hole and thereby maintain concentricity.

Unusual milling operation

A unique feature of this tooling is the use of the vertical milling spindle in the fourth working station, to mill the 0.035 in. slot in conjunction with the drilling and tapping. Since these operations are performed simultaneously, a complete handling and a separate slot machining setup were eliminated.

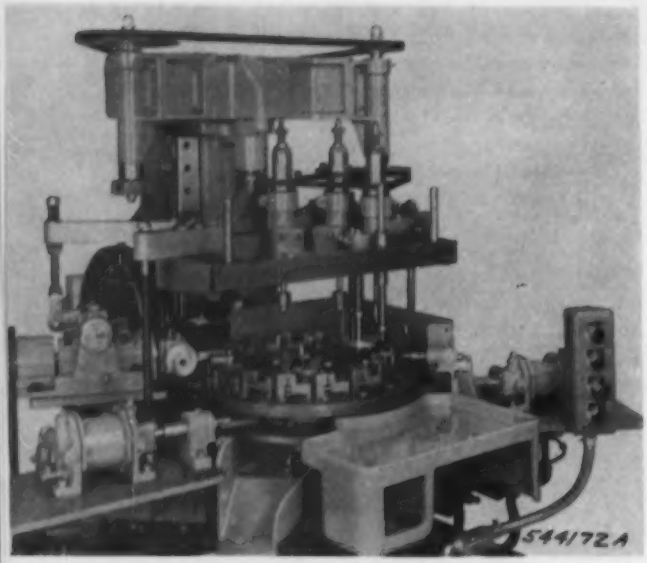
The tapping operation is performed last, after the slot is milled, to prevent having burrs thrown into the tapped hole from the milling. After the parts are automatically unclamped, they are hand unloaded from the dial, to prevent damaging the fine needle points on the tips.

Ring below dial carries spacers

Below the dial is a ring which carries a series of spacers. The procedure in changing from one needle valve to another is simply one of changing spacers in this ring to make up for the variation in length of the needles and to keep the top of the needles at the proper working height for the operations. This changeover requires about 15 minutes. The machine completes 750 needle valves per 50 minute hour.

The float valve seats appear with four variations. All are identical on the outside, but the hole diameter and the valve seat itself varies from part to part. The dial equipment used for the float valve seats is almost identical in appearance to that used for the needle valve. The only change is that the clamping jaws are fashioned to clamp on the head diameter of the valve seat and locate from the surface under the head diameter. The spindle equipment required to perform the operations is identical to the equipment required on the needle valves, except that the tapping spindle is not used.

The sequence of operations is as follows: One piece is hand fed to the clamping fixture per stroke of the machine. The fixture is then automatically clamped by an air cylinder. In the first spindle position, the two inside diameters of the float valve seat are accurately



DRILLING and milling of high speed nozzles. Guard at top has been removed to show how spindles may be shifted on mounting bracket, contributing to versatility of equipment.

reamed, using a combination tool and holding a concentricity of 0.004 in. T.I.R. (Total Indicator Reading) with the clamping diameter of the head.

In the second spindle position, the float valve seat itself is rough faced and the bottom squared. In the third spindle position, the float valve seat is finished-faced, holding a depth tolerance of 0.005 in. from the locating surface under the head. In the fourth working position, the 3/64 in. slot is milled 1/16 in. deep, using the same milling spindle used for the needle valves.

The working stations are identical to the working stations used for the needle valves. Spindles do not have to be moved when changing from job to job. The changeover required is only to change the clamping jaws themselves on the dial. The parts are automatically unclamped on the dial, using the air cylinder at the left of the machine, and are then automatically ejected by means of an inverted ejector underneath the dial and not visible in the photograph. The production rate for the float valve seats is 1100 pieces per 50 minute hour.

Seven different nozzles

The high speed nozzles presented a problem somewhat different. They appeared in seven variations, and although their size was approximately uniform throughout, the only operation performed that remained uniform was the milling of the slot in the end. The length of the nozzles varied from part to part and they contained from 1 to 3 metering holes through the side. The location of these holes varied from part to part, presenting a problem in design of tooling and in production.

Tooling selected for this job was a clamping fixture type dial somewhat similar to the dials used for the previous two parts, except that the work piece in this instance is clamped in a horizontal position. This necessitated the use of a horizontal rather than a vertical milling spindle to perform the slot milling operation, but allowed for the use of the three vertical drilling spindles used previously. Variation in length of the various high speed nozzles was accommodated by an adjustable stop behind the clamping fixture, which could readily be set for any given nozzle.

The operations performed are as follows: Hand feed the nozzles to the fixture, one piece per stroke of the Machine. The nozzle is then automatically positioned, brought against its locating stop, and automatically clamped by the air cylinder. The metering holes are then installed in their proper location, using from 1 to 3 vertical drill spindles, depending upon the specific part.

Production rate: 1500 in 50 min

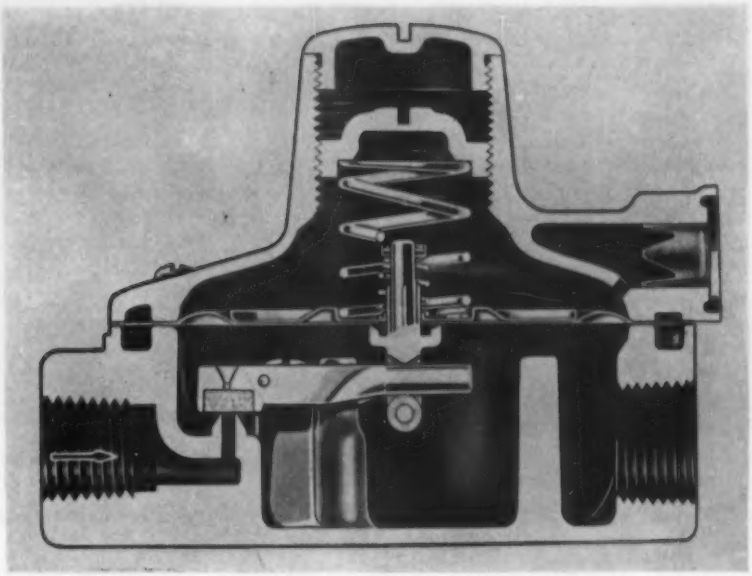
In this instance, each spindle carries its own drill jig to pilot the drill through a V-notched bushing. This insures that the cross holes will be central with the outside diameter of the nozzle. The last operation performed is to mill the 3/64 in. slot 1/16 in. deep, using the horizontal milling spindle. The parts are then automatically unclamped by the air cylinder at the left and are automatically ejected. The machine operates at 30 strokes a minute, giving a production rate of 1500 pieces per 50 minute hour.

Designed for interchangeability

Tooling and spindle layout for these three jobs are designed for maximum interchangeability, to facilitate rapid changeover from job to job. In changing from needle valves to float valve seats, the spindle positions remain fixed, and it is necessary only to change clamping fixtures on the dial.

The most extensive changeover is from either of the latter jobs to the high speed nozzle setup. This entails not only a complete change of dial and ring assemblies, but also a change of drill spindle locations and a change from the vertical milling spindle to the horizontal milling spindle. This changeover requires about 2 hours.

The installation affords an excellent example of how small run parts can be combined on a single special purpose machine tool to afford all the advantages of mass production units. Johnsson Motors expects that the machine will pay for itself in less than 9 months.



CUTAWAY view of L-P gas regulator. Zinc die cast body (lower half, below diaphragm) is nonporous, pressure resistant and leakproof.

Complex, Close Tolerance Part Made by Zinc Die Casting

◆ FOUR MAJOR production requirements are met with a zinc alloy die casting in a liquid petroleum gas regulator made by Fisher Governor Co., Marshalltown, Ia. These are pressure resistance, shape, cost and ease of manufacture.

Gas-tight surfaces and a leakproof body are important since the regulator is used in L-P gas household appliances where no leakage can be tolerated. Pressures encountered in service may run as high as 200 psi under certain conditions. The zinc die-cast body is nonporous and pressure resistant. Engineering specifications require that the inlet portion of the casting be capable of withstanding a 300 psi air pressure test without leaking.

To minimize the number of joints exposed to pressure, inlet and outlet connections are integrally cast as part of the regulator body. The result is a complex shape which is difficult to achieve by machining but easily produced as a zinc die casting. The ability of die casting to produce intricate contours is also utilized by designing the body interior with integral projections, pins and ribs.

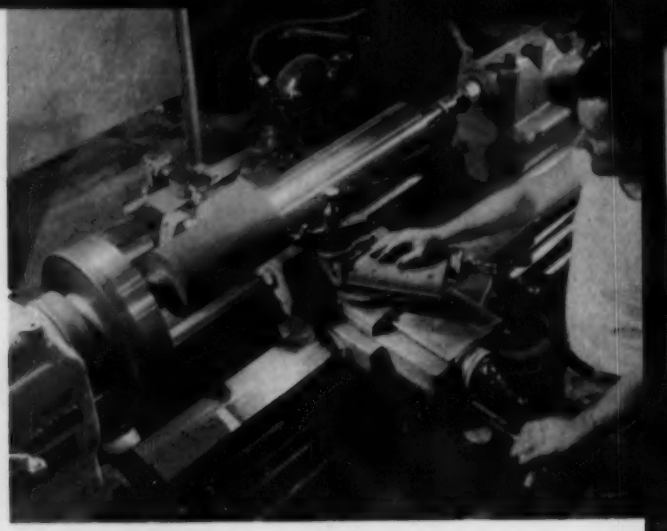
Because machining operations are held to a minimum on this regulator body, finished part cost remains competitive despite specification of as-cast dimensional tolerances as close as minus nothing, plus 0.004 in. As a fabrication method, zinc die casting is readily adapted to large quantity production techniques, an important consideration since several hundred thousand of these regulators are made yearly.

The gas regulator body is cast by Milwaukee Die Casting Co. of ASTM No. 25 zinc base alloy, a high copper alloy having a Charpy impact strength, as cast, of 48-ft lb and a tensile strength, as cast, of 47,600 psi. The part is produced two pieces at a time in a hydraulic, plunger-type zinc die casting machine. The production rate is approximately 1800 during an 8-hr day.

Following the die casting operation, flash is trimmed from the regulator body and the cored holes tapped. No further machining operations are required. Surface finish is smooth and clean and does not require special preparation prior to painting for good appearance.

ZINC die cast body used in Fisher L-P gas regulator. Note interior projections, pins and ribs cast integral with the regulator body.

Longer wearing—



ROLL is turned prior to wrapping with layers of resin-impregnated fabric. Roll surface is left slightly rough for better bond.

Plastics

Reduce Roll Maintenance in Tinplate Line

◆ Roll life in the plant of one large tinplate producer has been considerably improved through the use of plastic-covered rolls . . . Thermosetting laminated plastics are used.

◆ The material is claimed to have greater acid resistance, higher density and longer wearing properties . . . Wrapping and bonding methods are similar to those used for copper, brass, aluminum and various alloyed metals.

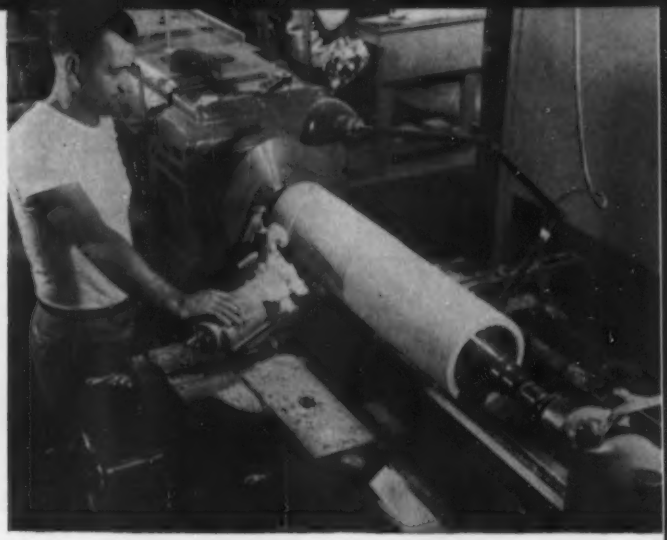
◆ PLASTIC-COVERED rolls in operation for several months at the plant of one of the country's largest tinplate producers are achieving a higher operating life than rubber rolls formerly used. Advantages claimed for the thermosetting laminated plastic now used include greater acid resistance, higher density and longer wearing properties.

To lower roll maintenance costs and reduce downtime in face of growing production demands, the tinplate producer took the problem to Steel Plant Equipment Corp., a Pittsburgh consulting firm. It was complicated by the fact that nearly every type of roll in the tin-plating line required a different surface hardness.

Rolls must remove moisture

The bridle roll which prevents the rapidly uncoiling sheet steel from buckling at high speeds must have a hard surface in order to resist abrasion. The hold-down rolls are required to withstand the combined effects of sulphuric acid and temperatures up to 200°F. Wiper rolls must be soft enough to remove moisture, yet firm enough to resist wear. Also, a set of insulated rolls are needed to keep the electric charging current from passing completely through the fast-moving steel strip.

HOLD-DOWN roll is clamped between heated pressure rollers on tube winding machine and wrapped a bit more than required thickness.



AFTER CURING, roll is turned to specified diameter. Covered steel roll now has good wear, chemical and moisture resistance.

Thermosetting laminated plastics filled most of the material requirements from the standpoint of mechanical strength, insulating properities, chemical and wear resistance. For this particular application, however, even more was required. Not only were special grades of laminated plastics needed, but a method had to be found whereby the laminates could be firmly bonded to many types of steel rolls of varying lengths and diameters.

Try resin treated fabric

To check the advisability of using laminates in this application, the problem was referred to Synthane Corp., Oaks, Pa., one of the leading manufacturers and fabricators of thermosetting laminated plastics for industrial use.

After more than several months of development work, Synthane engineers recommended combining a special fabric with a resin treatment which insured greater penetration of filler materials. Several types of resins, including Bakelite phenolics, were specified depending upon the type of roll, size, and function.

Once the basic fabric and resin formulas were established, covering the rolls to the required thickness was merely a matter of routine. Wrapping and bonding followed the same procedure the company has used for copper, brass, aluminum and various alloyed metals.

Experimental rolls were stripped of their rubber coating, placed in a large lathe and turned down about 1/16 in. The roll faces were left slightly roughened to provide a stronger bond between metal and laminate. After machining, the rolls were heated to 250°F, placed on a tube-winding machine and, with the roll itself serving as a mandrel, wrapped with the special impregnated fabric to slightly more than the required thickness.

After wrapping, the laminate-covered rolls were oven-cured at 300°F to insure complete polymerization of the wound layers. Following this, roll ends were trimmed flush and the entire assembly was finished off by being mounted in a lathe to be turned down to the exact outside diameter specified.

When returned to service, the new plastic covered rolls achieved a normal operating life more than three times greater than the rubber-coated rolls formerly used.

During the time these rolls have been in service, several advantages have become apparent. For one thing, laminated plastics are more resistant to acids. Secondly, since laminates are both nonmagnetic and antistatic, they cannot pick up metallic chips which might scratch or score the high finish of the relatively thin tin coating. Also, because of the density of the laminate covering, foreign particles cannot imbed themselves in the roll.

Surface toughness has advantages

This inherent surface toughness has several other distinct advantages. It completely eliminates patterns sometimes caused by tiny abraded particles of rubber. These particles, adhering to the strip steel, actually become insulators, preventing the soluble tin from being electrolytically deposited on the steel.

The density and excellent wear resistance of laminate covered rolls has also overcome the damage done by poor edge cutting and gouging. This in turn eliminates the principal reasons for excessive vibration and chatter, two of the most destructive enemies of a high speed tinplating operation.

Hot dip galvanizing—

By W. G. Imhoff, President
The Wallace G. Imhoff Co., Los Angeles

Temperature Control Key to Longer Pot Life

◆ Modern research has taken the mystery out of what happens in the hot dip galvanizing pot as temperature rises . . . The result has been longer pot life through a better understanding of the mechanics of zinc-iron alloy formation.

◆ Best bet for long equipment life is to keep galvanizing bath temperature under 885°F . . . Apply heat uniformly to pot sides. . . Above 900°F dissolving action of zinc increases rapidly.

◆ PRACTICAL MEN have always recognized temperature as a basic cause of hot dip galvanizing pot failure. When the temperature went above 900°, normal galvanizing temperature, pot destruction was rapid. Research, however, has given galvanizers a more accurate picture of the mechanism of pot failure and has clearly outlined operating temperatures with a view to extending pot life.

Galvanizers at one time believed that if they raised galvanizing bath temperature, they would get a lighter zinc deposit as galvanized coating. They knew, by the "feel" of the operation, that the action of the molten zinc on the base metal started at about 860°F. Careful research has proved, however, that the higher the bath temperature, the heavier the zinc is deposited.

A study was made to see what happens when iron is in contact with molten zinc starting at 800°F and testing every 50 degrees up to 1000°F, and then at 1100°F, 1300°F and 1500°F. This temperature range extends far above the bath temperatures of practical galvanizing operations. A small square of 28 gage one-pass cold-rolled sheet iron was used in the tests.

To avoid outside iron contamination all tests were made in small vitreous clay crucibles of negligible iron content. Tests were conducted individually, and the zinc melt in the crucible was held at temperature for 6 hours. Then the melt with test piece in it, was allowed to cool.

Each melt was sawed in half, and a chemical analysis made of one half, while the other half was carefully polished and studied under a microscope at 36 magnifications.

The iron contents of the melts at the different temperatures are shown below:

Temperature, Deg F	Iron Dissolved, Grams
800	0.0681
850	0.0614
900	0.1104
950	1.0050
1000	0.7132
1100	0.6618
1300	1.6738
1500	1.6590

Hot Dip Galvanizing Temperatures

◆ Hot dip galvanizing baths should never go above 900°F. Maximum safe operating temperature should always be under 885°F. Heat application to the galvanizing pot sides must be absolutely uniform.

◆ As temperature moves above 900°F, the dissolving action of the zinc will become more and more violent. If the temperature goes to 1100°F or above, it is only a question of time, and thickness of pot sides, until the pot will fail with a hole dissolved through the side.

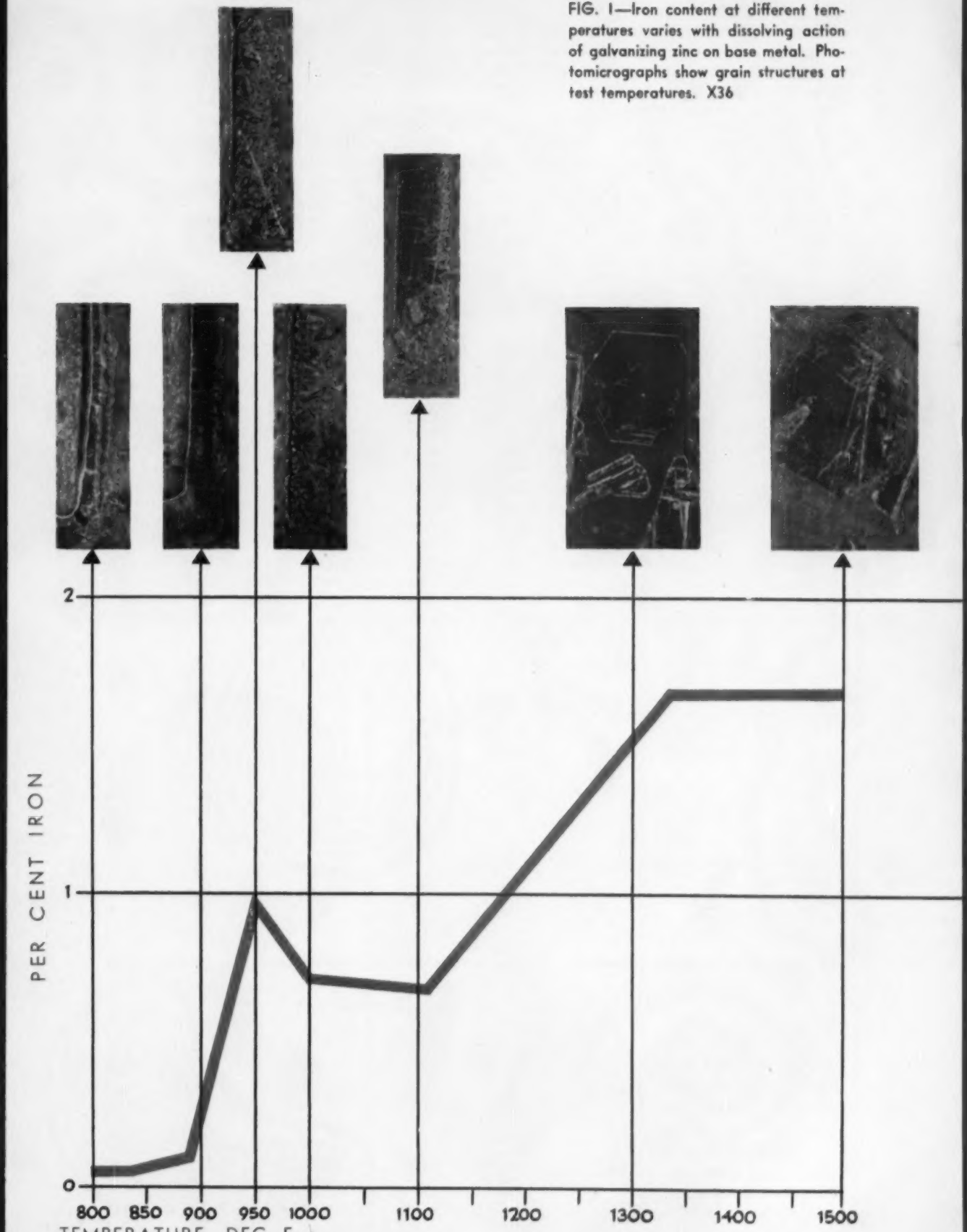


FIG. 1—Iron content at different temperatures varies with dissolving action of galvanizing zinc on base metal. Photomicrographs show grain structures at test temperatures. X36

These values were plotted as shown in Fig. 1. In the first stage, a dissolving action takes place up to 950°F. Practically no dissolving action is shown up to 850°F. Starting at 850°F there is a very slight increase in the dissolving action up to 900°F. From 900°F to 950°F there is violent dissolving action on the iron base—equal to almost 10 times the dissolving action at 900°F.

Dissolving action slowed

In the second phase, between 950°F and 1100°F, recrystallization takes place. The zinc-iron alloy crystals have changed from a rhombohedron crystal of the hexagonal system, to a pyramid of the first order, in the hexagonal system. The drop in the iron content of the melts, would indicate that, during recrystallization and at these temperatures, dissolving action was slowed down. Photomicrographs for 1000°F and 1100°F show the sample sheets have not been attacked and dissolved as much as the sheet in the melt at 950°F.

In the third phase, between 1100°F and 1300°F, dissolving action on the base metal again becomes very active. At 1300°F the iron sheet has been entirely dissolved in the zinc melt. The iron available has gone to form the six-sided zinc-iron alloy crystals. The graph would probably have gone up farther if there had been more iron to dissolve, i.e., if the test pieces had been thicker.

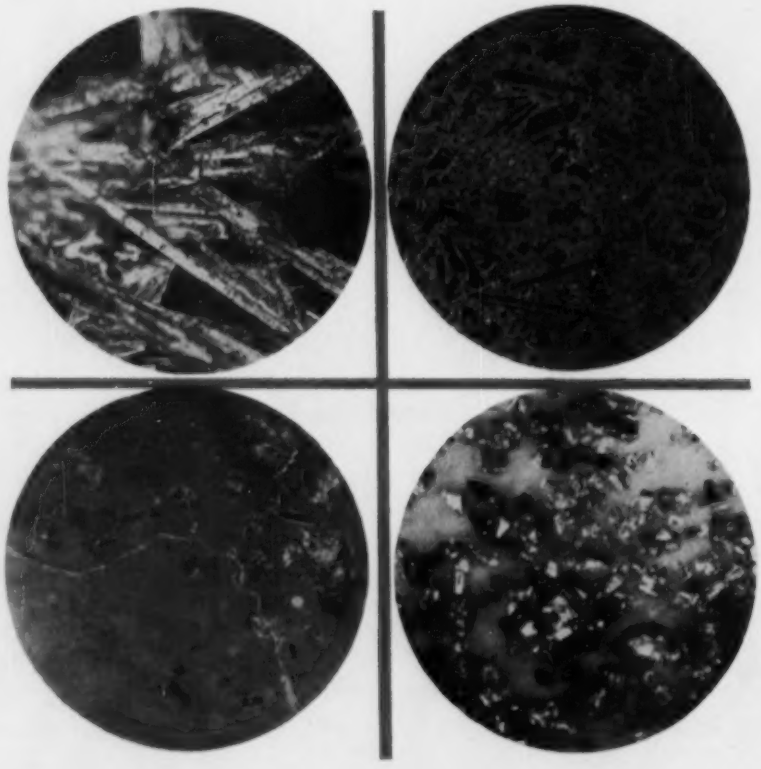
The final phase of the graph shows a straight horizontal line indicating there is no more iron to dissolve. At 1500°F, and with slow undisturbed cooling, a larger zinc-iron alloy crystal results.

Results from other investigations throw additional light on what is depicted in the graph. The long slender rhombohedron form of the zinc-iron alloy which always forms at temperatures under 900°F is shown in Fig. 2. The same type crystal is shown in Fig. 3, a photomicrograph of plant dross having an iron content of 3.39 pct. The long crystals are parallel to the cut surface. The short small triangles indicate the needle-like crystals are out at various angles in the melt. This type of crystal indicates that the bath temperature, at the point where the sample was obtained, is under 900°F.

Plates form pyramid point

The long slender rhombohedrons change their form of crystallization from 900°F to 950°F while at the same time, the dissolving action on the iron becomes extremely violent, and multiplies by 10.

The six-sided form of these new crystals is shown clearly in Fig. 4. A number of complete crystals were separated out and placed under the microscope. These are shown in Fig. 5. The individual six-sided plates can be easily seen, and some of the crystals show what looks like a pile of these plates between the pyramid points. A close study of the points shows they are made up of six-sided plates which become smaller and smaller, until they finally end in a point.



Left
FIG. 2 — Long, slender needle-like crystals of zinc-iron alloy are rhombohedrons. X36

Right
FIG. 3—Zinc-iron crystals formed (from dross) below 900°F, have 3.39 pct Fe content. X36

Left
FIG. 4—Zinc-iron alloy crystals of the type formed at temperatures above 900°F. X36

Right
FIG. 5—Isolated zinc-iron alloy crystals of the type formed at temperatures above 900°F. X36

Fig. 1

producing this pulley assembly shows off the versatility of Hydroforming

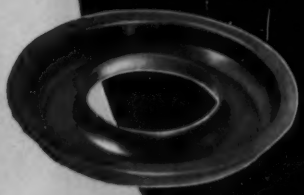


Fig. 2

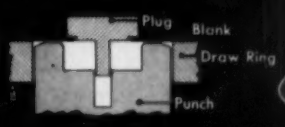


Fig. 3

Fig. 4

Fig. 5

In addition to drawing simple or intricate shapes, the Cincinnati Hydroform accomplishes simultaneously what are considered conventional *die set* operations. This is illustrated by the ingenious method used to produce the forming operations for the experimental short run pulley assembly shown in Fig. 1.

The pulley flange section (Fig. 2) was Hydroformed complete in *one* operation from a flat, 8″ dia. blank of 0.062″ cold rolled steel having a 2½″ dia. center hole. The walled hole was produced at the same time as the balance of the part by use of a piloted plug which formed the material into a recess in the punch. (See Fig. 3.)

The hub flange section (Fig. 4) was produced in *two* operations. The hub was first drawn using conventional Hydroform tools—a punch and draw ring. In the second operation, a ring was used to form the balance of the part. (See Fig. 5.) This combined a forming and a restriking operation which produced the required dimensional accuracy, including the sharp 0.060″ compound radii on the flange.

Thus the Hydroform can often be tooled inexpensively to do *more* than deep drawing and forming, saving operations which *further reduce* the cost of your development work . . . or your short run parts production. Let a Cincinnati Milling field engineer give you complete details. General Hydroform data and specifications of the 8″, 12″, 19″, 23″, 26″ and 32″ machine sizes are given in Bulletin M-1759-2. Write for your copy.

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FREE AIDS

New Technical Literature:

Catalogues and Bulletins

Aluminum bronzes

Properities of 18 grades of aluminum bronzes are shown in this technical data bulletin. The properties listed include chemical composition, tensile and yield strengths, elongation, reduction in area, and hardness. Suggested applications are also listed. WW metal aluminum bronzes are available in centrifugal, permanent mold and sand castings. *WW Alloys, Inc., Div. of Fansteel Metallurgical Corp.*

For free copy circle No. 1 on postcard, p. 101.

Data sheet

A new immersion thermocouple which enables operators of open hearth and electric furnaces to measure bath temperatures on a full-time operating basis is the subject of this data sheet. Advantages are described. *Leeds & Northrup Co.*

For free copy circle No. 2 on postcard, p. 101.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 101.

Test bars

Current test bar theory and practice are discussed in this new bulletin. Aimed at the copper and aluminum alloy casting field, the book is written from a foundryman's viewpoint. Design of test bar patterns, production of test bars, including melting, pouring, heat treatment, testing procedures and many other subjects are covered in detail with pertinent illustrations. *Federated Metals Div., American Smelting & Refining Co.*

For free copy circle No. 3 on postcard, p. 101.

Float-treat

Rex Float-Treat is the subject of this new bulletin. Float-treat is a new mechanical process used to separate greases, chemical flocs, and suspended organic matter from industrial waste liquids. The booklet describes the Float-treat system in detail through the use of plan views, diagrams, and pictures. *Chain Belt Co.*

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Precision machining

Precision machining is discussed in this new brochure. The brochure depicts actual case histories of routine, intricate and seemingly impossible special machining projects recently completed. The catalog also features a list of facilities. *Connecticut Mechanical Industries, Inc.*

For free copy circle No. 5 on postcard, p. 101.

Transformer

A new line of distribution transformers is the subject of this new booklet. The single phase, 2 to 167 kva, pole type transformers are discussed in detail. Discussed are corrosion resistance, sealing, installation operation and maintenance. *Westinghouse Electric Corp.*

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Materials handling

Martin-Decker's hydraulic materials-handling equipment is described in this new bulletin. Such items as hook scales, tensiometers, crane weight indicators, lift-truck scales, logweighers, load cells, check valves, and stroking diaphragms are shown. *Martin-Decker Corp.*

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Metallic O-rings

Metallic O-rings, static seals which are relatively unaffected by temperature, are covered in this new folder. Emphasized are the sealing characteristics, low cost, simplicity, and flexibility of design of these rings. The rings are shown and their features pointed out and discussed. Many graphs, drawings and tables give additional information. *United Aircraft Products, Inc.*

For free copy circle No. 8 on postcard, p. 101.

Tools

Standard cemented carbide tools and blanks are covered in this new condensed catalog. The latest price changes and specifications are given. The catalog lists specifications and prices on throw-away inserts, new saw tips, solid and brazed type woodworking knife blanks, right and left-hand offset threading tools and blanks for roller turner tools. *Carboloy Dept., General Electric Co.*

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Compression fixture

The new compression fixture and setting gage for recessing tools is described in this new bulletin. The bulletin also gives details of Scully-Jones' micrometer grinding fixture for circular form tools used in automatic screw machines and recessing tools. These new products were designed primarily to speed the setting of recessing tools and to provide a quick, sure method for sharpening circular form cutters, assuring accurate grooving operations, according to the bulletin. *Scully-Jones & Co.*

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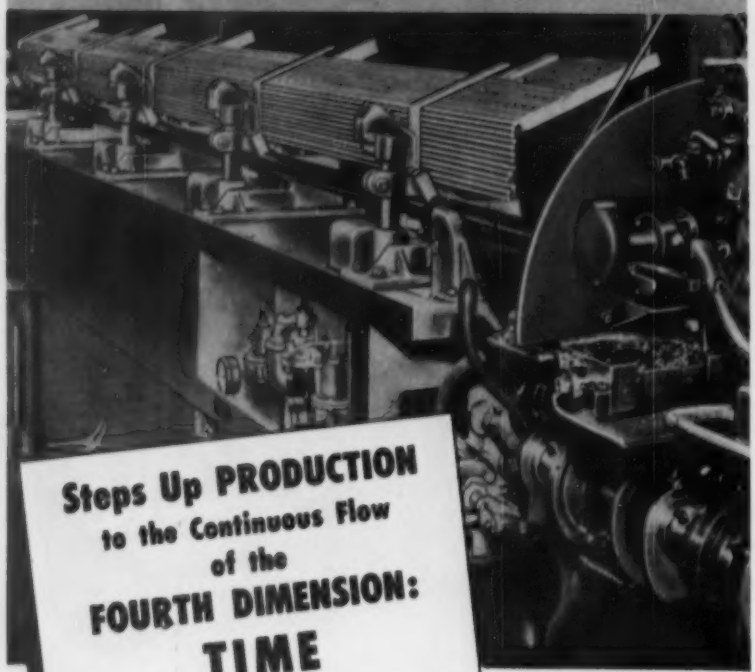

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FREE TECHNICAL LITERATURE

Muffles and retorts

Thermalloy high-heat resistant muffles and retorts are covered in this new bulletin. The bulletin describes how these high alloy castings are designed to resist abrasion, corrosive gases and excessive heat up to 2100° F. A breakdown of the thermalloy group of high alloys into A. C. I. grades and alloy content is included. Free design and engineering services are also offered. *Electro-Alloys Div., American Brake Shoe Co.*

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Lathes

Cincinnati lathes are covered in these technical bulletins enclosed in a large folder. A catalog service manual and parts list is included. Pictures, diagrams, tables and graphs give pertinent information. Complete specifications are included. *Cincinnati Lathe & Tool Co.*

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Wall chart

The engineering properties of nickel alloy wire, rod and strip are presented in this convenient wall chart. It is designed to help engineers select the right nickel alloy in wire, rod or strip form for their specific products. Materials whose properties are described include nickel monel, inconel, incoloy and nickel-clad copper. *Alloy Metal Wire Div., H. K. Porter Co., Inc.*

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Overhead cranes

Information on selection and specification of overhead cranes is contained in this new technical bulletin. The bulletin is designed to help prospective crane buyers analyze handling problems, decide on the type of crane desired and draw up specification sheets for crane proposals. Basic data is given on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with standard dimensions and clearances. *Whiting Corp.*

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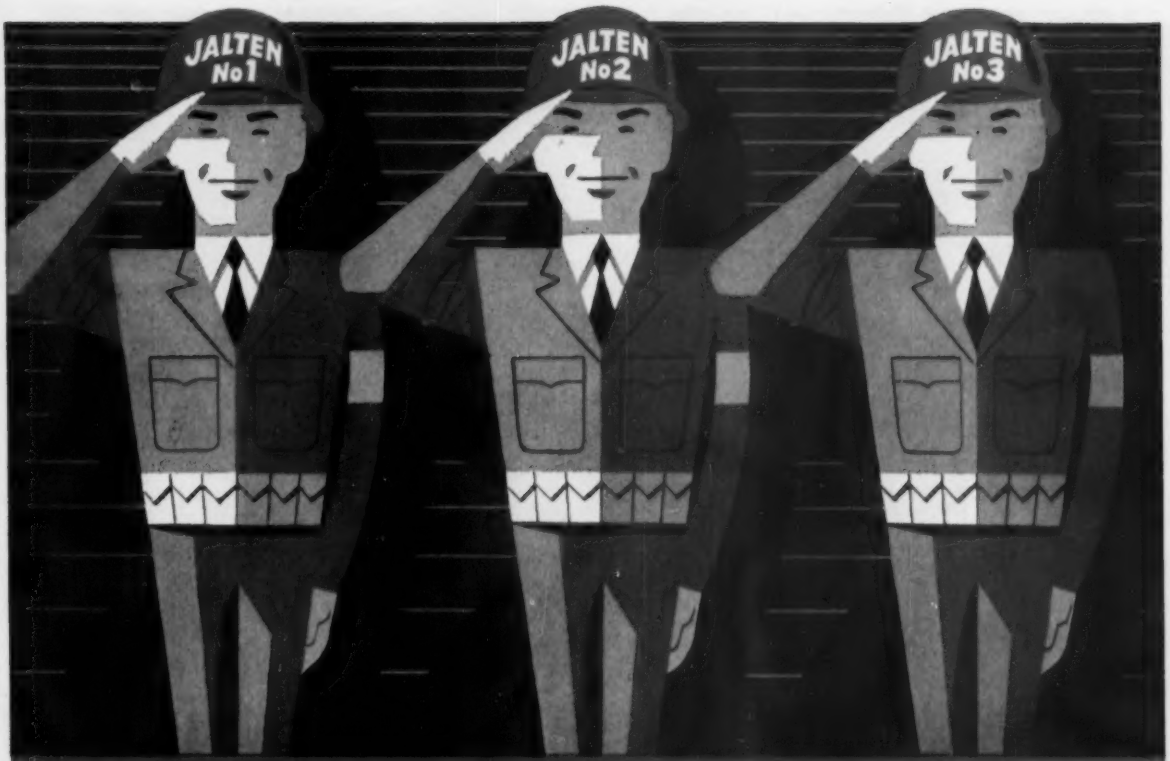
Turn Page



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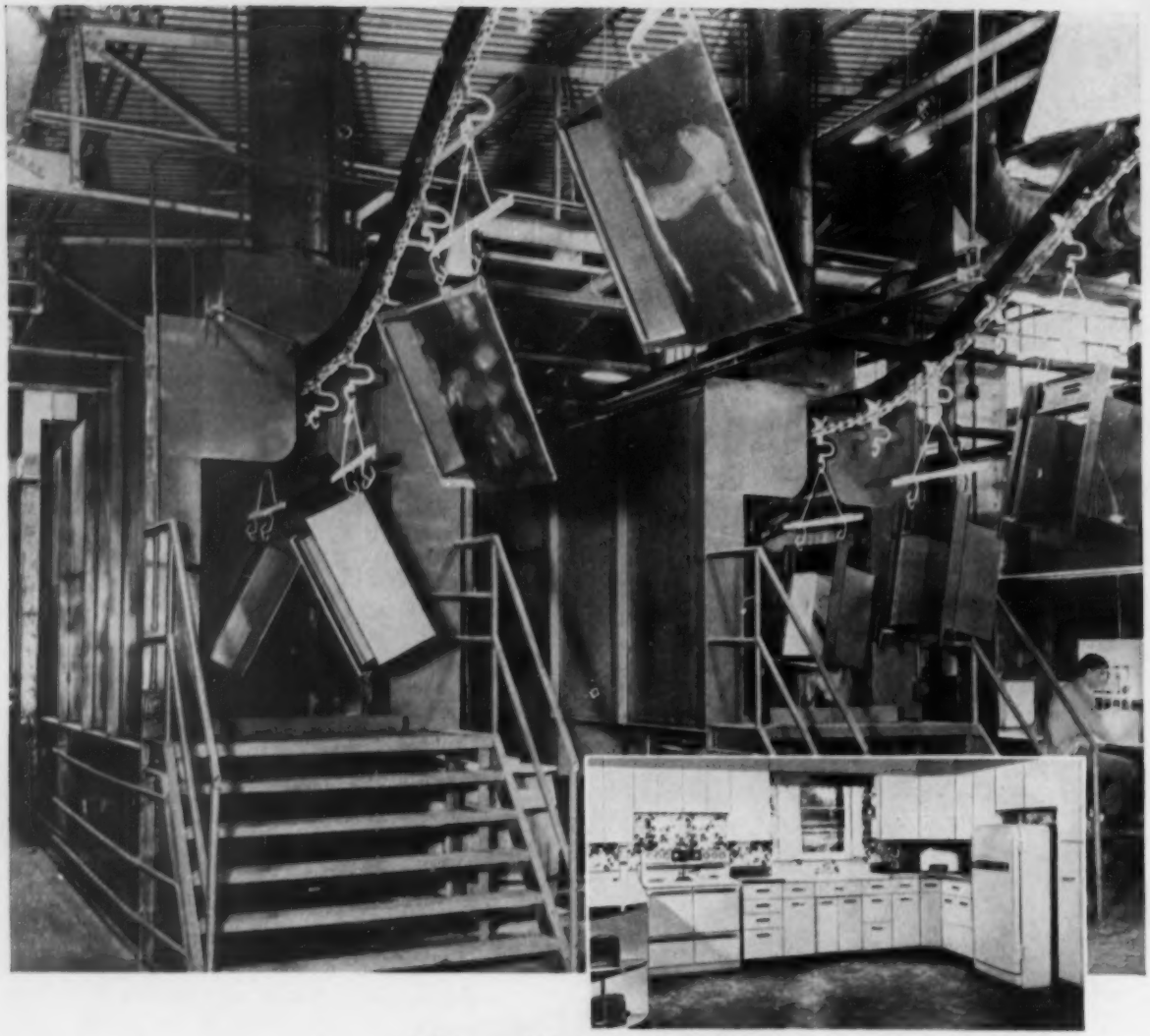

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This section starts on page 96

Thermoflex

Thermoflex, a multi-purpose refractory-fiber felt for service to 2000° F, is covered in this folder. Originally developed as a jet engine insulation, Thermoflex is available for many uses. Among these are as a filter medium for hot gases and liquids, sound control, and refractory packing and fill. It is suitable for use in the nuclear energy field. The folder gives essential data on Thermoflex, including its K factor, sound absorption qualities, chemical and thermal stability, densities, sizes and thicknesses. *Johns-Manville.*

For free copy circle No. 15 on postcard.

Perforated metals

Perforated metal is the topic of this new booklet. Buying information, the end uses of perforated metal, manufacturing processes and illustrated samples of perforated metal are contained. The versatility of perforated metal is emphasized. *Standard Stamping & Perforating Co.*

For your copy write on your company letterhead to address shown on reply card.

Transmitters

The Brown pneumatic time-pattern transmitter unit is covered in this new booklet. This instrument positions the set point indices of one or more instruments according to a definite time-pattern. Complete specifications are included. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 16 on postcard.

Safety catalog

A new general catalog—55A on Industrial Safety Equipment is available from Willson Products, Inc. This new, easy-to-read, fully illustrated catalog is designed as a workable, everyday safety manual. The catalog is divided into four major sections—eye protection, head protection, respiratory protection, and welding. Illustrations, descriptions, and ordering information have been correlated for simplicity and practicability. All who have an interest in industrial safety will find this new catalog a reference book of great interest and value. *Willson Products, Inc.*

For free copy circle No. 17 on postcard.

Wire flattening

Current wire flattening theory and practice is covered in this new bulletin. Illustrated with schematic drawings, graphs and pictures, the bulletin outlines convenient methods of determining spread, wire size and wire power requirements. *Stanat Mfg. Co.*

For free copy circle No. 18 on postcard.

Fork truck

The fork truck of the future, Clarks' experimental Model X-70, is covered in this new volume of Material Handling News. Other equipment featured in the book include electric, gas-powered or Diesel-powered fork trucks. *Clark Equipment Co., Industrial Truck Div.*

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Production digest

Authoritative papers on coated abrasive grinding and polishing techniques are contained in this new production digest. It is assembled from 20 technical papers prepared by Behr-Manning methods engineers during the past two years for leading periodicals in the metalworking and the woodworking fields. Subjects covered include: coated abrasives theory and practice, coutour polishing and grinding, the inside polishing of recesses and small openings, the conversion of polishing jacks to belt usage, contact wheels, and many others. *Behr-Manning Corp.*

For free copy circle No. 20 on postcard.

Lathes

Levin lathes and presses are covered in this new catalog. Precision lathes for second operations, manufacturing, toolmaking, instrument work and watchmaking are covered. Also discussed are micro-drill presses for very small hole drilling, micro-drills and watchmakers' tools. *Louis Levin & Son, Inc.*

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Temperature control

The Burling Instrument Co. line of temperature controls is described in this new bulletin. This bulletin covers the Model D-1S, primarily used for controlling temperatures up to 1800° F, where a wide and easily adjustable range is required. The instrument operates by the differential expansion of solids and uses no filled bulb. A snap-action switch, rated at 15 amp, 125-250 volts, 60 cycles, is actuated by the tube expansion through a lever. *Burling Instrument Co.*

For free copy circle No. 22 on postcard.

Steel

The story of immediate steel is the title of this new booklet. Products covered include bars, plates, cold finished bars, alloy steels, stainless steels, tubular products, sheets and strip, reinforcing steel and other products. *Joseph T. Ryerson & Son, Inc.*

For free copy circle No. 23 on postcard.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Rust prevention

Rust prevention is covered in this new catalog. The catalog features 98 color chips of Rust-Oleum products and includes complete instructions for surface preparation and application of Rust-Oleum Primers, Machinery and Implement Finishes, sealers, oil field finishes, thinning oils and floor and masonry coatings. *Rust-Oleum Corp.*

For free copy circle No. 24 on postcard.

Rubber and vinyl

Sun rubber and vinyl is covered in this new catalog. Sun equipment, volume and production are discussed. Core molded products and compression molding are covered. Rubber extrusions are discussed. Products featured include rubber laminations, die cut parts, vinyl foam sponge and hollow molded vinyl. *Sun Rubber Co.*

For free copy circle No. 25 on postcard.

Screw accessories

Magnetic screw holding accessories for power screw drivers and nut setters are covered in this new manual. How to utilize the force of modern high energy permanent magnets for holding screws, bolts or nuts in assembly operations is completely explained. Simplified tables graphically show how to select the proper magnetic driver or finder after considering the screw size, type of driving recess and amount of clearance available. Included also is a section on Magna Tip Hand Screw Drivers. *Magna Driver Corp.*

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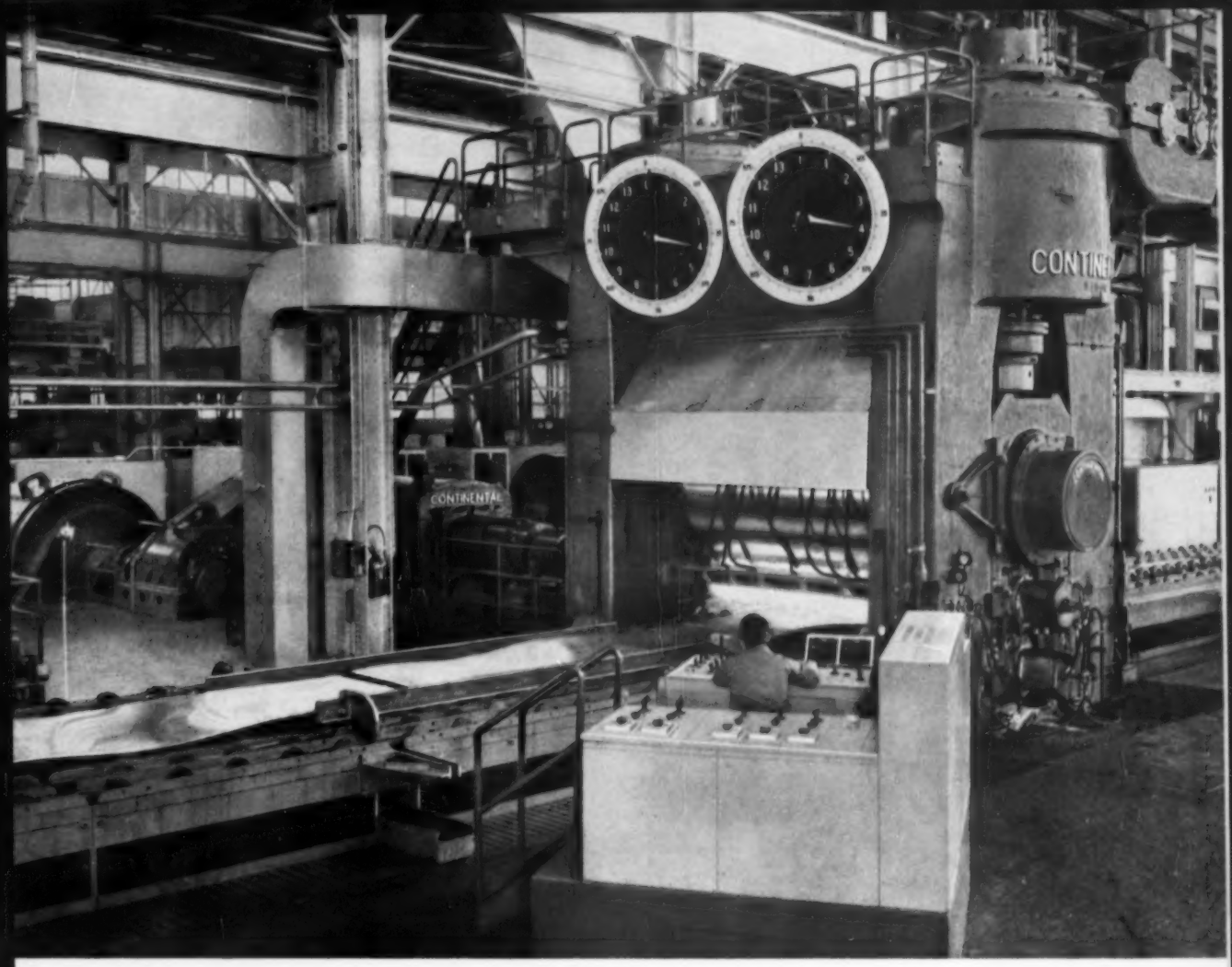

144-inch Four-High Tapered Plate Mill, Aluminum Company of America, Davenport, Iowa.

Now! A high-precision Plate Mill by Continental

This heavy-duty Continental 144-inch four-high plate mill built for Aluminum Company of America's Davenport, Iowa, Works produces a uniform, predetermined end-to-end taper in both sheet or plate aluminum alloy, as well as the full range of commercial plate. Both hot and cold rolling operations are performed on this mill. Gauges and tapers are maintained to the most exacting requirements. Continental produces—from preliminary engineering to satisfactory operation—varied types of ferrous and non-ferrous mills, with complete auxiliaries, for flat and shape rolling.

Plants at
East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.
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CHICAGO • PITTSBURGH

CONTINENTAL
Foundry & Machine
Company

"This is the Continental Chipper that reduced our billet conditioning costs 67%"

WISCONSIN STEEL DIVISION
INTERNATIONAL-HARVESTER CO.

In actual service, the Continental Chipper reduced billet chipping costs 67% by increasing chipping speeds and reducing time-consuming handling.

The Continental Chipper applies the principles of automation to billet conditioning by providing a completely mechanized continuous system. All billet handling is accomplished mechanically and a new method that travels the billet beneath a stationary, rotating cutter head is used. Complete manipulation and accurate chipping is obtained from a single control point and one operator. New high standards in chipping efficiency and speed are being set.

Auxiliary equipment, such as the Unscrambler and mobile inspection car, is available to supplement the operation of the Chipper. The Unscrambler separates stacked or mixed billets and feeds them mechanically to an inspection car which provides full maneuverability for inspection and carries the billet to the Chipper feed bed or delivery point. Ask your Continental representative for a complete description.

Plants at
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Foundry & Machine
Company

for faster,
cleaner, sounder welds use
CRUCIBLE STAINLESS ELECTRODES...

You're *sure* of fast deposition, uniform quality welds, with Crucible stainless steel electrodes. For Crucible pioneered in the *development* of stainless electrodes . . . and its welding engineers have a wealth of manufacturing and application experience for you to draw upon.

And you'll find a complete assortment of Crucible stainless bare welding rods and coated electrodes for both AC and DC welding . . . including special high carbon corrosion- and heat-resisting electrodes . . . armorize electrodes for armor plate welding . . . and electrodes for cast iron welding.

Whatever your application . . . whatever welding procedure you use . . . there is a Crucible stainless welding wire or electrode for the job. You'll get them *fast* from your nearest Crucible warehouse or welding equipment distributor. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

PRESSES: Keep Pace With Industry Needs

Automation and changing demands for sheetmetal products in both the appliance and automotive industries have brought major changes in the design of modern industrial presses . . . Build "packaged press."

A major engineering program involving new press designs for auomotive and appliance industries has recently been completed by E. W. Bliss Co. The program, in which engineers from these two industries cooperated, centered on single and multi-action designs for forming and drawing large stampings such as auto roofs, fenders and refrigerator doors.

Two recent concepts in sheetmetal production gave impetus to the program. For one, the presses conform to Joint Industry Conference bolster, bed, die and slide area specifications and to blankholder and plunger dimensions.

Interchangeable Tooling

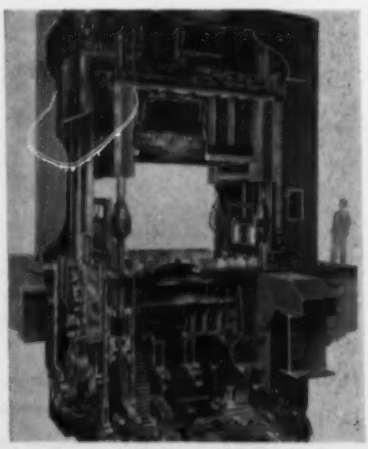
Now an auto factory can make several sets of dies and ship them to distant plants knowing that dies will fit. Moreover, standard dimensions for mounting make it possible to move the presses easily during model changeovers and to switch them from one press line to another in case of breakdowns.

The second concept involves that of designing presses from the ground up for automation. Heretofore, as auto plants moved toward the mechanized factory, the automatic material handling machinery that evolved—feeders, unloaders, kickers, lifters and dopers—were simply attached to a press until it looked like a Christmas tree. Wires and pipes grew so complex that both users and builders agreed to design new machinery.

More Parts "Built-In"

As engineers discussed the problem, the term "in-building" was used more frequently than any other. They spoke of built-in wires, pipes, automatic lubrication systems, and press and automation machinery controls.

Gradually an entirely new press began to take shape, a "packaged press," one in which the builder



Designed for automation . . .

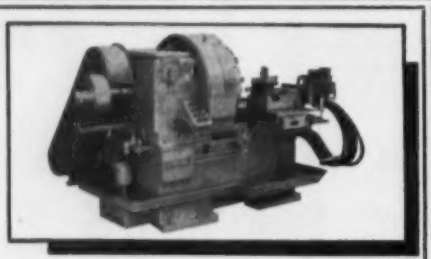
WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 101. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Solve YOUR PUMP PROBLEM

with a

RUTHMAN GUSHER coolant pump



Illustrated is a LeBlond Automatic Contour Facing Lathe equipped with a Ruthman Gusher Coolant Pump.

Choose a Gusher Coolant Pump for performance, economy, long life. Built of the finest materials, Gusher Pumps give split-second coolant flow, as much or as little as you want. Your Gusher needs no priming or packing, uses less power when throttled. Precision workmanship assures long trouble-free life. Specify Gusher Pumps to solve your coolant pump problems.

THE RUTHMAN MACHINERY CO.

1809-1823 READING ROAD CINCINNATI 2, OHIO

assumes most of the responsibility for building wiring, piping and controls into the frame. Packaged presses are not plugged in as easily as a vacuum cleaner, but they are as close to "plug-in" types as possible.

Exterior Streamlined

With Bliss' new lines of streamlined enclosed presses, all controls, wiring, piping, even power and air line takeoffs are built into the uprights. The clean, uncluttered exterior, essential to automatic production, makes it easier to equip them with automatic feeding and unloading machinery. Installation is simplified because wiring, electric controls and pipes are already positioned; only in-plant connection need to be made.

In addition, two of the new lines feature the underdrive design, with its lower overall height. The drive is becoming popular with automated plants because modern buildings are spread out and low; headroom for cranes is at a premium—especially with high-crowned presses.

Grinding:

Automatic grinder finishes pump rotors.

A unique automatic grinder is making possible the low cost production of high precision rotors and vanes for use in automobile power steering and power brake pumps. The motor grinder, developed by the DoAll Co., Des Plaines, Ill., incorporates automatic fixturing to handle parts.

The operation consists of grinding twelve slots in the rotor vanes that fit in the slots. The quality of fit and finish must be equal to a lapped finish. Since it was economically impractical to finish the milled slots by lapping, plunge grinding on an automatic basis is used.

The rotors are made of oil hardening tool steel. Prior to the grinding operation, the slots are milled and the rotor is hardened to 61-62 Rc. The rotor faces are then lapped to achieve proper part thickness and finish.

USS Gerrard ties ANYTHING you've ever seen

FROM FLAT-STRAPPED PACKAGES OF SHEET STEEL... TO ROUND-STRAPPED CARTONS OF WELDING ROD

● USS GERRARD Strapping, Round and Flat, is ideal for palletizing, unitizing, crating.

● USS GERRARD Round Strapping costs about *40% less* than any other form of metal reinforcement.

● USS GERRARD hand-operated and semi-automatic machines tie quickly, efficiently.

● USS GERRARD-strapped bundles and pallets can be handled more safely in less time. Accidents averted, man-hours saved.

● Steel-strapped bundles require only one inventory. No loose pieces. Pilferage eliminated.

● Single-source buying of both Round and Flat Steel Strapping reduces freight charges and paper work.

Bring your packaging and tying problems to USS GERRARD. Our engineers are here to help you solve them—at no cost to you.

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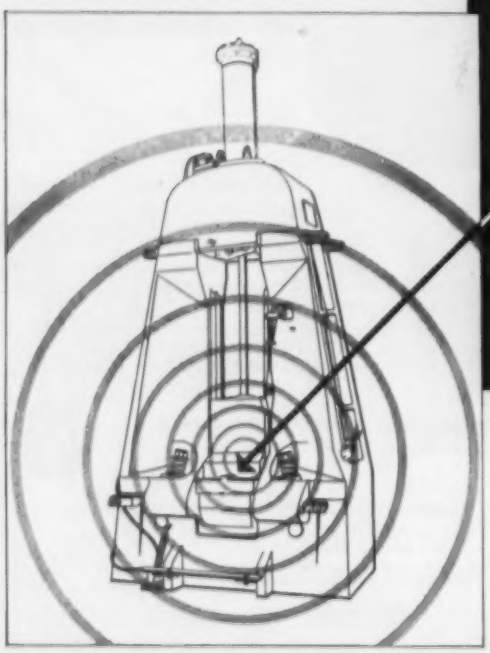
USS GERRARD STEEL STRAPPING
Round and Flat

UNITED STATES STEEL

CECO-DROP'S LOW CENTER OF GRAVITY ASSURES AGAINST MIS-MATCHED FORGINGS

The center of gravity of the CECO-DROP approximates the center of gravity of the ram at the point of impact, minimizing the fight between the ram and the other parts of the hammer. This gives a more effective blow, preserves die



alignment, which assures fewer rejects, and results in higher production in comparison with other types of hammers.

Write for a copy of Bulletin 57-L-4

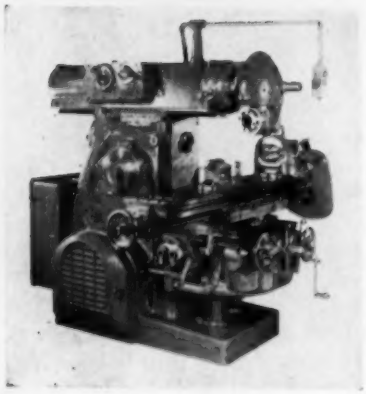
CECO-DROP

Made by the BUILDERS of THE IMPACTER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 101 or 102



Vertical, horizontal, angular milling on one machine

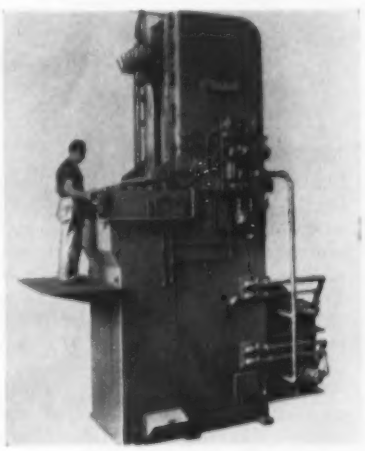
New line of ram head milling machines offer industry a machine tool with a dual personality. The machines combine a conventional horizontal spindle and a self-contained motorized sliding ram for adjustable cutting heads. Horizontal and vertical spindles can be run separately and simultaneously. A choice of three cutting heads, universal, vertical and quill types which can be rotated through 360°, means the user can perform vertical, horizontal and angular milling on one machine in a single setup. Ram head machines are versatile and economical for general purpose production milling. They are built with 69 different working range combinations, and in No. 2 to No. 4 in both plain and universal styles. The ram head is individually motor-driven, has its own lubrication system and speed-change mechanism. *Kearney & Trecker Corp.*

For more data circle No. 27 on postcard, p. 101.

Hydraulic machine broaches sleeve yoke parts

This American 60-ton, 72-in. stroke hydraulic pull down machine broaches the internal spline and sizes the hole in 30 different sleeve yoke parts. Two 40-hp motors provide the power for the broaching stroke and fixture operation. The machine is equipped with four broaching stations with manual control levers on the special broach pull heads. The levers allow the operator to disengage the broach for retooling. A shuttle mechanism automatically transfers parts into the broaching position and then retracts allowing the operator to load during the broaching stroke. Split locating leafs, mounted on the shuttle unit, radially locate the ears of the yoke parts in relation to the splines to be broached. Parts are held in location until the broaching stroke has started, insuring accurate alignment. Dual safety control buttons start the cycle after operator manually loads machine. Parts are automatically ejected after broaching. *American Broach & Machine Co.*

For more data circle No. 28 on postcard, p. 101.



Huge gear hobber cuts spur, helical and worm gears

A gigantic 132-in. Gould & Eberhardt heavy duty gear hobber, capable of doing precision work on gear blanks up to 132 in. diam, 3½ in. C.P. and 54 in. face, has been added to the production facilities of Illinois Gear & Machine Co. The gear hobber will cut spur, helical and worm gears with exceptional accuracy to a tolerance of 0.0003 in. for maximum tooth spacing error, and to a tolerance of within 0.001 in. for the parallelism of the teeth. This machine is equipped with a work table that has a 102 in. diam and will safely handle a work table load of 100,000 lb. Ground hobs, 12 in. diam and 15 in. face are used on the machine. Smallest diameter gear which can be cut in this hobber is 44 in. diam. *Illinois Gear & Machine Co.*

For more data circle No. 29 on postcard, p. 101.

Turn Page

Secret of a Whistling Good Shave

Another triumph of creative engineering

Friend of ours makes razor blades for a living. Tells us the secret of a whistling good shave lies in using a uniformly sharp blade every time.

Now, it's not so difficult to make a good blade, when money is no object. But to *mass produce* top blade quality for a price is an entirely different problem.

Taft-Peirce has recently built a number of machines to this customer's specifications. Each machine automatically grinds, sharpens, strops and hones a strip of metal. Mass produces finished razor blades of uniformly *better* quality, at a pleasingly *lower* cost.

Perhaps you have a special machine or machining problem like this that Taft-Peirce creative skills and experience can help you solve. For more information send for 92 page illustrated booklet, "Take It To Taft-Peirce."

We'll Design It . . . Some typical design assists by T-P engineers — a silent typewriter, automobile engine, automatic lens grinders, countless machine-tools and smaller mechanisms.

Tool It . . . Several large corporations rely exclusively on the T-P Toolroom for tool design and manufacture.

Make It . . . 1500 machine tools . . . 450,000 square feet of plant — provide the facilities for anything from a single simple part to thousands of complex units.

Test It . . . A separate production line may be set up in sequence operation — from manufacturing through assembly, test, and final inspection.

Ship It . . . Taft-Peirce offers you all or any part of these services.

For Engineering, Tooling, Contract Manufacturing

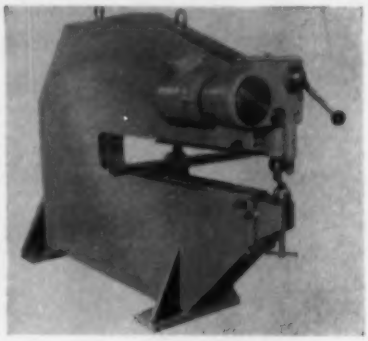
TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R.I.

TELEPHONE: WOONSOCKET 1

Metal shop in one machine

The Pullmax sheet and plate working machine is used by maintenance departments for straight shearing, circle cutting, irregular cutting, slot cutting, louver cutting, beading, joggling, and dishing. The machines feature quick

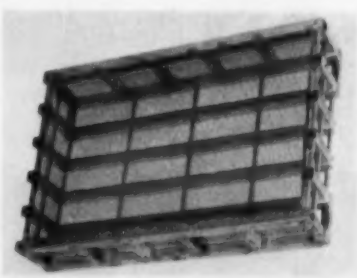


locking, fast adjusting centers and guides for speed in changing sizes or types of work. The line includes nine sizes of machines up to the Major II model that cuts paper thin stock up to 11/32 in. in mild steel, and is available with pneumatically operated centers and power feed. *American Pullmax Co.*

For more data circle No. 30 on postcard, p. 101.

Expansion tray

An Inconel pusher tray with a channel frame allows it to expand and contract when heated without becoming deformed. The tray is being used successfully for carbo-



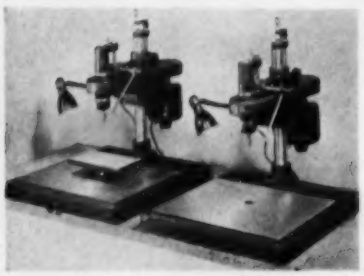
nitriding small metal parts in an Ipsen furnace, at a temperature of 1500°F. Overall dimensions of the tray are 21x33x6 in. deep. It is constructed of wire mesh on a channel frame with reinforcing corner plate. Mesh liner is replaceable. *Wiretex Mfg. Co., Inc.*

For more data circle No. 31 on postcard, p. 101.

Accurate torques assured with minimum time and effort

Latest in a line of torque multipliers for high torque nut applications is the Model 104 Powerench. It is built on a pinion and ratcheting gear segment principle with a power ratio of 12:1. The tool is manually operated with a work handle or tension indicator. Because of its power advantage, only 150 ft lb need be applied at input to obtain 1800 ft lb at output. Model 104 has a working load output of 7000 ft lb and is strength tested to 10,000 ft lb. Special anchoring devices necessary to position a Powerench and to anchor the torque reaction are available from the manufacturer to fit the desired application. *B. K. Sweeney Mfg. Co.*

For more data circle No. 32 on postcard, p. 101.



Tool room drilling machine drills small holes

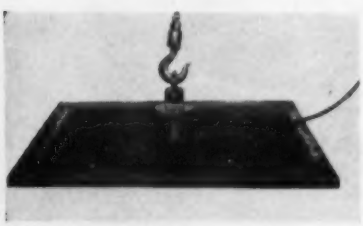
This super-sensitive drilling machine is designed to drill small holes (0.004 to 5/16 in.) in all drillable materials. With its extra large, accurately machined base pad, 21 x 17 in., it affords ample working space for dies, jigs, fixtures, and other tool room parts. The machine will drill to the center of a 16-in. workpiece. Four spindle speeds are obtained through one drive. Four available drives provide spindle speeds from 750 to 8750 rpm. The self-contained drilling unit swings radially on the column and locks in any position. *Hamilton Tool Co.*

For more data circle No. 33 on postcard, p. 101.

Folder brakes offer fast, accurate production

Three new models of Chicago folder brakes are made in a single-wing model, a double-wing model with open throat and fixed head, and a double - wing model with open throat and moving head. Machines are custom built to meet requirements for length of bend, distance between bends, sharp or radius bends with or without flanges, offsets, or beads. Any of the brakes may be had as a single purpose machine or may incorporate flexibility to handle a variety of sizes or products. Pneumatic, hydraulic, or mechanical operation is offered. *Dreis & Krump Mfg. Co.*

For more data circle No. 34 on postcard, p. 101.

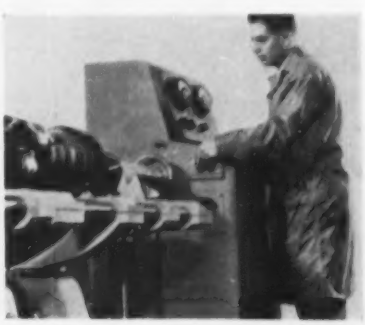


Hand-size lifting magnet handles 240 pounds

Featuring new coil-winding and heat-dissipating design, an inexpensive 4-in. diam lifting magnet is said to lift heavy iron and steel pieces up to 240 lb all day long without losing strength. Other small magnets of the same design, in 6, 8 and 10-in. diam fill the needs of machine shops, metal fabricating and other industries having intermittent need for electromagnetic equipment capable of handling heavy loads. *Magnetic Engr. & Mfg. Co.*

For more data circle No. 35 on postcard, p. 101.

Balancing machines automatically indicate unbalance



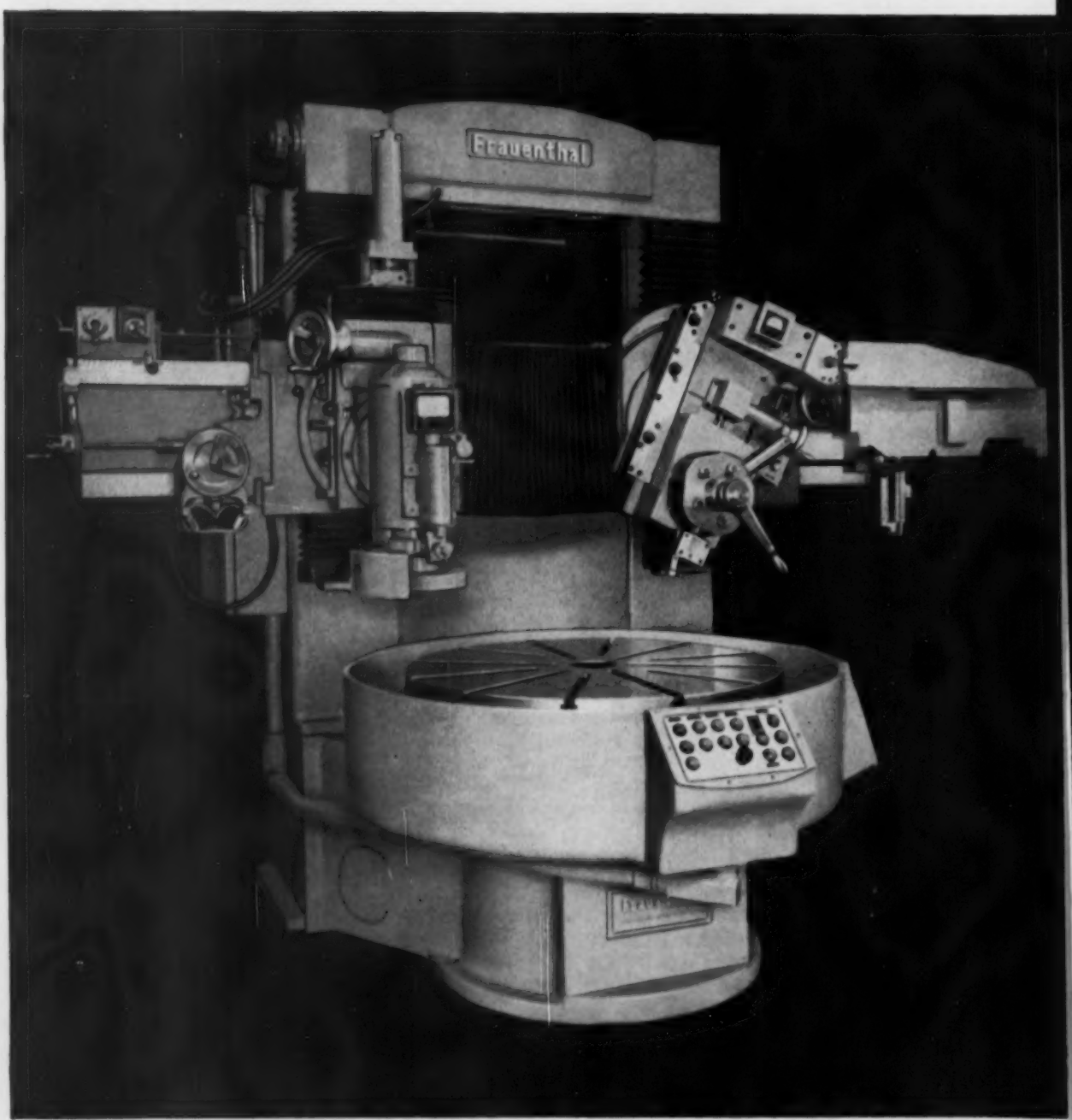
On new horizontal static-dynamic balancing machines, automatic indication of unbalance is secured instantly for the selected plane of correction, by means of a highly sensitive electodyne electronic indicating system. Angle and amount of unbalance are clearly shown on two large meters mounted in the face of the control panel. The plane of correction is changed quickly with the pivot shifter which assures positive plane separation. Calibration of the indicating system can be checked or changed at any time with a screwdriver. Full scale on the amount meter can be set to indicate any desired amount of unbalance. *Tinius Olsen Testing Machine Co.*

For more data circle No. 36 on postcard, p. 101.

Turn to Page 113

CAN YOU

to .000200" accuracy



turn, bore and grind in a single set-up?

The Frauenthal 3100 Series offers this precision and versatility with these cost-cutting features

1. Utmost versatility — Both grinding compound and turret slide can be swiveled to meet practically any angular requirement.

2. Super-precision performance — Only a Frauenthal grinds related surfaces to accuracies within .000200″, producing consistently uniform precision in concentricity, parallelism and roundness.

3. Horizontal table — Loads easier and faster than vertical face plates. Horizontal table also provides greater stability for large, heavy parts.

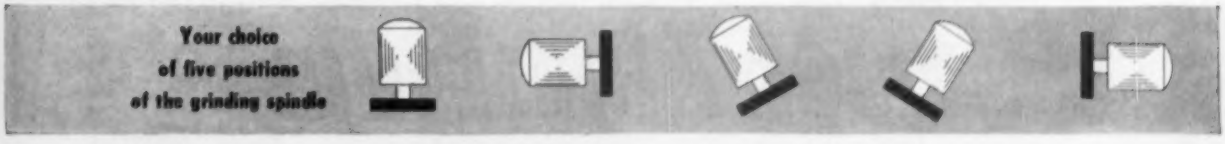
4. Simplified tooling — Horizontal table permits simpler fixtures, particularly for thin-section jet engine parts, plus economy of dual purpose tooling for turning and grinding.

5. Convenient controls — All operating controls are easily within the operator's reach for quick selection of feeds and speeds. Electrical interlocks are provided for utmost safety.

6. Contour turning — Hydraulic duplicator attachment (turning head) performs tracer controlled turning operations most accurately and performs repetitive operations at lower cost.

May we help you?

If you'd like further information on how the 3100 Series precision turning and grinding machine can give you production and/or tool room advantages — our engineers are at your service. Write for informative bulletin No. 301.



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Your Kaiser Aluminum Distributor will!

He's GEARED to meet your emergency needs, to go to work for you the minute you call. From his large stocks of aluminum, he'll quickly provide you with almost any size, shape or alloy—slit, sawed or sheared to your needs.

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If you want to borrow on the wide experience of your Kaiser Aluminum Distributor, he can specify the exact type of aluminum your product requires. He can suggest methods of using aluminum more economically. He can supply you with small quantities for experimental work.

All these services mean more profits for you because they help lower your costs. Why not call your Kaiser Aluminum Distributor today?

Kaiser Aluminum

Your Kaiser Aluminum Distributor is listed at the right... See him—soon!

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Nottingham Steel Company, Atlantic 1-5100
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NEW YORK METROPOLITAN AREA
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Walker 5-7500
A. R. Purdy Co., Inc.
Lyndhurst: Webster 9-8100
New York: Chelsea 3-4455
Newark: Humboldt 2-5566
OAKLAND, Calif.
American Brass & Copper Co., Higate 4-2366
Gilmore Steel & Supply Company
Glencourt 1-1680
Earle M. Jorgensen Co., Higate 4-2030
OMAHA, Nebr., Atlantic 1830
Gate City Steel Works
PHILADELPHIA, Penna., Delaware 6-5400
Hill-Chase & Company, Inc.
Allentown: Hemlock 2-8077
York: York 5790
PHOENIX, Ariz., Phone 8-5331
Arizona Hardware Co., Inc.
PITTSBURGH, Penna., Hemlock 1-5803
Follansbee Metal Warehouses
PORT ARTHUR, Tex., Phone 5-9377
Standard Brass & Mfg. Co.
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Eagle Metals Inc. of Oregon
SAN FRANCISCO, Calif., Klondike 2-8511
Gilmore Steel & Supply Company
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SHREVEPORT, La., Phone 2-9483
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ST. LOUIS, Mo., Franklin 0212
Hubbell Metals Inc.
SYRACUSE, N.Y., Syracuse 72-6677
A. R. Purdy Co., Inc.
TULSA, Okla., Phone 85-1511
Earle M. Jorgensen Co.
WICHITA, Kans., Amhurst 7-1208, 7-1809
General Metals Incorporated
WILKES-BARRE, Penna., Butler 7-3813
Hill-Chase & Company, Inc.
WORCESTER, Mass., Worcester 7-4521
Merrill Aluminum Corporation

Universal shear

This universal shear with cutting capacity for ½ in. plate, ¾ in. flat sections, round sections up to 1⅜ in., squares to 1¼ in., other sections and angles, operates at 30 strokes per min. The machine can be furnished in motorized model with starter mounted convenient to the operating side. Direct transmission bearings are SKF ball

bearings and the eccentric shafts are carried in bronze bearings. All exposed bearings and slide faces are automatically lubricated by means of an adjustable oil pump. Adjustment from intermittent to continuous operation is effected by a simple hand lever. A slot die is provided for cutting angles in plates, flat bars, T's and angles. *Industrial Sales Co.*

For more data circle No. 37 on postcard, p. 101.

Replaceable carbide tips

New type center called Grip-Tip consists of a tool steel holder and a replaceable carbide tip. The rugged holder is available in sev-

eral standard Brown & Sharpe, Morse and Jarno shank tapers. Solid carbide tips are made in ¼ and ½ in. diam and are accurate to 0.0005 in. Tips are inserted or removed by turning a screw. *Detroit Reamer & Tool Co.*

For more data circle No. 38 on postcard, p. 101.

Turn Page

Tempilstik°

FOR ALL HEAT-DEPENDENT OPERATIONS

looks like a crayon...
marks like a crayon...
tells temperatures like a precision instrument!

Sixty-three different compositions enable you to determine and control working temperatures from 113° to 2000° F. TEMPILSTIK° marks on workpiece "say when" by melting at stated temperatures—plus or minus 1%.

ALSO AVAILABLE IN LIQUID AND PELLET FORM ... WRITE "CUSTOMER SERVICE" FOR SAMPLE TEMPIL° PELLETS ... STATE TEMPERATURES OF INTEREST—PLEASE!

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For every type of shearing machine
and every kind of job
"multicut"
SHEAR BLADES and ROTARY KNIVES
Rx Engineered to the job . . . Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.
"MULTICUT", "TUFCUT", "HOT WORK"
THE WAPAKONETA MACHINE CO.
WAPAKONETA, OHIO.
Knives Engineered for the Job Since 1891

ULBRICH
Stainless
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Immediate Delivery from Stock

STRIP · Flat Wire and other Stainless Steels

a foot or a pound and up to your EXACT requirements from the BIGGEST little Converting Mill in the country.

Complete Inventory

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Established 1924

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

Scrap magnet

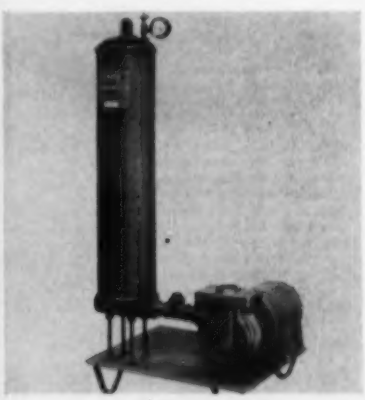
Light-weight, 45-in. lifting magnet speeds up material handling on scrap yard boom cranes. Weighing 3200 lb, the magnet is claimed to be 20 pct lighter than conventional 45-in. sizes, lifts 95 pct or

more of established capacities and has a faster discharge time. Improved weight-to-capacity ratio is obtained by use of lighter-type metal for the coil, and by more economical use of the coil winding area. *Electric Controller & Mfg. Co.*

For more data circle No. 39 on postcard, p. 101.

Filtration unit

A new package filtration unit is capable of handling up to 9000 gph of water, allowing deduction of 50 pct for friction losses. This Model



2-C Rumaco all bronze pump has a CunoFilter. Driving motor of 1½ hp at 3450 rpm is available for any current characteristics required for domestic or industrial applications. *Ruthman Machinery Co.*

For more data circle No. 40 on postcard, p. 101.

Indexing work holder

For use on milling machines and pantographs a new indexing work holder is small and lightweight; holds work up to 6 in. diam, of any face width. Work is mounted on a simple fixture, and held by a draw bar through the hollow, heat-

treated and ground spindle. Spindle itself may be locked in any position, and the graduated swivel joint allows the work to be pivoted and clamped in any position from horizontal to vertical. Index plates are easily changed by removing a single nut, and are available with any number up to 60 notches. *Johnson & Bassett, Inc.*

For more data circle No. 41 on postcard, p. 101.

Pressure lubricant

Spray-Lube, a new type extreme pressure lubricant makes it possible to spray a heavy duty lubricant on open gears, open chains, valve

stems, etc., without preheating. It will not drip or throw off running gears. Excellent adhering qualities make it a good rust preventive. Spray-Lube reduces waste, eliminates mess, can be carried in a pocket. *Pressure Products Co.*

For more data circle No. 42 on postcard, p. 101.

Turn Page

EXACT WEIGHT Scales Offer Accuracy, Speed, Long Service!

EXACT WEIGHT Scales clip seconds off each weighing operation. Short lever fall plus the action of an adjustable damping mechanism bring weight indicator to rest quickly. Fractional-ounce visible indication enables operator to make an accurate reading at a glance. Weigh accurately in out-of-level position. The 900-series scale illustrated has a capacity of 25 or 50 pounds and is available with choice of end-reading or side-reading dial; flat-platter, removable-scoop, or sack-rest commodity holder. Write for full details.

ExactWeight Scales

Better quality control
Better cost control

THE EXACT WEIGHT SCALE COMPANY
936 W. Fifth Avenue, Columbus 8, Ohio
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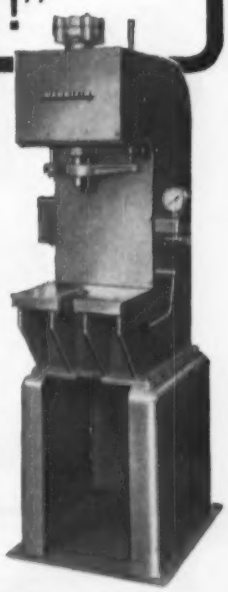
"BEST $1286 WE EVER SPENT!"



That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

HANNIFIN

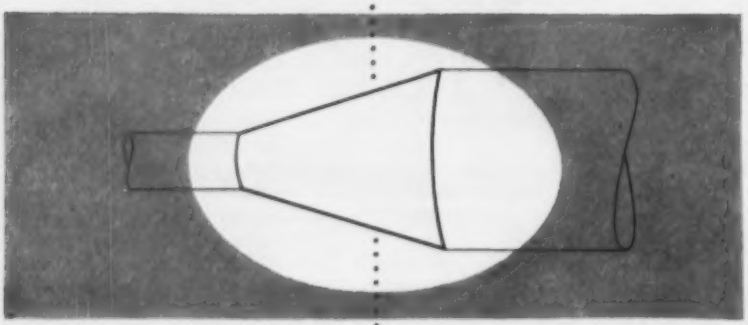
Hannifin Corporation, 513 S. Wolf Road, Des Plaines, Illinois

Lathe tailstock pressure tested simply, quickly

A time-saving method of production checking the hydraulic tailstock pressure of lathes is possible with a Dillon pressure gage. The test is quick and simple. The gage is placed between blocks, which, in turn, are held between the gage and tailstock and the Camlock spindle nose. Full tailstock pressure is then exerted against the gage by turning a tiny crank on the side of the tailstock, and a reading in pounds is instantly given on the gage dial. Pressure gages range from 0-10 to 0-10,000 lb. Capacity accuracy is 1 pct ± reading. *W. C. Dillon & Co., Inc.*

For more data circle No. 43 on postcard, p. 101.

TITUSVILLE FORGED PIPE REDUCERS



Meet All Requirements for Industrial Piping Systems

Bench machined to your most exacting requirements—Titusville Forge pipe reducers can be furnished in carbon or alloy steel—for every industrial piping system. Bevels are machined to special sizes for welding. Hollow bored pipe and fittings also can be supplied in carbon, stainless steel or other alloys.

Latest manufacturing techniques and newest cost-saving methods are employed at Titusville Forge. Our long years of experience, modern fabricating facilities and special knowledge of design are your assurance of dependability in forgings to meet your requirements.

Struthers Wells

STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

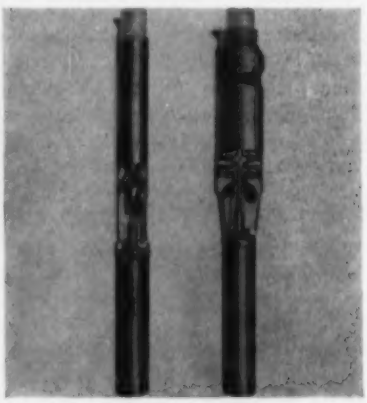
TITUSVILLE, PA.

PLANTS AT TITUSVILLE, PA., and WARREN, PA.

Offices in Principal Cities

Submersible pumps

New submersible turbine pumps are designed for water system service in 4 in. and larger wells. Entire pumping unit is made of corrosion-resistant materials for operating completely submerged in the well water. Pump needs no priming. It is practically noiseless



in operation and requires a minimum of power. Moving parts of pump are water-cooled and water lubricated. As the tank and control may be located away from the well, if desired, and the service line placed below ground, no pump house is required. Capacities range from 600 to 7000 gph (10 to 121 gpm). *Deming Co.*

For more data circle No. 44 on postcard, p. 101.

Marking unit

Electrochemical etcher makes a complete mark in a few seconds on medium to small round, flat or odd-shaped metal parts. Marking is done with chemically conductive fluid and the aid of electrical current passing through a marking assembly that utilizes a stencil to produce a clear permanent mark. *Product Marking Co.*

For more data circle No. 45 on postcard, p. 101.

Wet-type gear grinder

Automatic wet-type grinder provides high-speed production of straight bevel Coniflex gears. It produces gears up to 8½ in. pitch diam. 1⅜ in. face width and 3 DP. All standard pressure angles can be ground. Fine pitch gears are ground directly from the solid blank. Gears coarser than 20 DP are ground after cutting and hardening. Two disk-type grinding wheels are used on the No. 105 grinder. Grinding is done on the flat sides of the wheels, and the tooth profile shape is generated by a relative rolling motion between the gear blank and the grinding wheels. The entire grinding cycle is entirely automatic, including the correct number of passes, in-feed of the work and dressing of the wheels at pre-selected intervals. *Gleason Works.*

For more data circle No. 46 on postcard, p. 101.

Portable pipe machine

New portable pipe and bolt threading machine, the No. 552 Pipe Master, will ream, thread and cut off all sizes of pipe from ⅛ to 2 in. and will drive geared die-stocks and cutters up to 12 in., through a

special drive shaft. The machine has a ½ hp universal, geared-head variable speed motor. Spindle speeds are automatically variable with load—22 to 36. It is equipped with floating-type, adjustable die-head and a wrenchless front chuck. *Oster Mfg. Co.*

For more data circle No. 47 on postcard, p. 101.

DEMING pumps for industry

Pictured above is an example of the adaptability of Deming Vertical Turbine Pumps in the metal producing and metal working industries. This installation is in a midwestern steel plant.

The unit illustrated is a Deming Fig. 4700 Vertical Turbine Pump equipped with a short length of column to place the suction inlet at the proper location.

Hot water alkaline solution at temperatures from 180° to 210°F. is pumped through spray nozzles to a scrubbing machine to clean the acid from steel sheets after the pickling process.

The important advantages of Deming Vertical Turbine Pumps for this type of service are the elimination of priming problems and the ease with which submergence may be provided to prevent vapor locking with liquids near the boiling point.

THE DEMING CO., 566 BROADWAY, SALEM, OHIO

75th ANNIVERSARY DEMING PUMPS 1880 - 1955

The complete line of Deming Industrial Pumps covers a wide range of types, sizes and capacities to meet most requirements of the metal producing and metal working industries. A nationwide network of Deming Distributors assures localized service everywhere. Write for complete details.

Specify DEMING PUMPS

What's New in Steel Service

Again in 1955, as in every year since 1842, Ryerson is setting the steel-service pace. Many advances in our ability to serve you have been made in recent months—many more are immediately ahead. Briefly, here is what you can expect:

EXPANDED STOCKS—Amazing new leaded alloys in three carbon ranges—carbon steel plates produced to an "easy-welding and forming" specification—304L and 316L stainless plates and sheets for superior welding characteristics—type 430 stainless sheets for those who want an alternate to higher priced 18-8 stainless. These are a few recent additions and further stock expansion is already under way.

NEW QUALITY SAFEGUARDS—Steel you order from Ryerson now protected by a whole new set of quality control standards—tighter than any thought possible before. As evidence of uniform high quality we can furnish a certificate of analysis or a mechanical properties report for every pound of steel we ship.

STEPPED-UP SERVICE—On 92 to 98% of the regular orders we receive, steel is cut and shipped the same or following day. With two new plants getting into operation, and with facilities enlarged and modernized from coast to coast, we'll do even better in the weeks ahead.

So here's our steel-service pledge to you—an even wider selection of steels, dependable high quality, delivery where you want it—when you want it—now and throughout 1955.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY. . .

Labor may be most important factor in steel market this year . . . Bargaining in Detroit will influence steel talks . . . See stronger market.

Strong Push . . . Labor may turn out to be the most important factor in the steel market this year. Both the steel industry and its biggest customer, the auto industry, will be negotiating new wage contracts during the first half of the year. Both will find the going tough.

There is no reason to believe that both will be able to clear the wage hurdle without a disrupting strike. But even if new wage agreements can be worked out peacefully in both industries, the coming bargaining will add a strong push to the steel market.

Timetable . . . On May 1 the United Steelworkers of America can serve notice of its desire to reopen its contract on wage rates only. If a new agreement is not reached by midnight of June 30, the union is free to strike.

But a month before the steel wage contract deadline the famous 5-year pacts in the auto industry expire. If labor is serious about winning the guaranteed annual wage this year, it looks as if Walter Reuther and his United Auto Workers will have to lead the fight. David McDonald, head of the steel union, apparently has no thought of torturing the language of his present contract to ring in the GAW issue.

It is doubtful that Mr. Reuther will be able to get to first base with his demand for guaranteed annual wage. But the bargaining in Detroit is bound to have a very strong effect on the steel wage talks.

Hedge . . . The auto industry is expected to build as many cars as it can before it begins wage talks, the idea being that a reservoir of cars would strengthen its bargaining hand. But so far there is no evidence that there is any float in the terrific production schedules that keep setting records week after week.

Even if there is not a strike in Detroit, auto production will have to be curtailed eventually. If current production rates are continued, the industry will produce 3.3 million cars by the end of May, against a predicted 1955 market of 5.8 million.

Production . . . Steelmaking operations this week are scheduled at 82.5 pct of rated capacity, up half a point from the previous week.

This week there are signs that oil country demand is getting its second breath. Outlook for tinplate is brighter, and plate orders are moving up.

Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted	1,989	2,007	1,726	1,766
Ingot Index				
(1947—49=100)	123.8	124.9	107.4	109.9
Operating Rates				
Chicago	85.0	86.0	83.0	81.0
Pittsburgh	77.0	79.0	70.0	86.0
Philadelphia	75.0	73.0	65.0	78.0
Valley	81.0	78.0	69.0	71.0
West	88.0	89.0*	62.0	78.0
Detroit	99.0	100.0	84.0	85.0
Buffalo	100.0	100.0	100.0	63.5
Cleveland	80.5	85.0*	91.0	82.5
Birmingham	74.0	74.0	67.0	87.0
S. Ohio River	93.0	95.5	90.0	78.0
Wheeling	98.0	99.0*	67.0	81.0
St. Louis	87.5	78.0	63.0	65.0
Northeast	73.5	70.0	56.5	61.0
Aggregate	82.5	82.0	74.0	74.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$34.50	$34.33	$32.83	$28.50
Nonferrous				
Aluminum, ingot	23.20	22.70	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	12.80
Magnesium, ingot	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	86.75	86.125	85.625	84.50
Zinc, E. St. Louis	11.50	11.50	11.50	9.50

Auto Industry Buying Strong

Some automakers buying cold-rolled sheets for June delivery . . . UAW strike could depress market . . . Pipeline projects give plate market a shot in the arm.

◆ STEEL DEMAND from the automotive industry may continue at high level through second quarter. Several car producers have already booked cold-rolled sheet orders for June delivery.

While such orders are subject to cancellation, they indicate optimism of the automobile companies over sales prospects this year.

Of course, a strike in one or more of the major companies whose contracts with the United Autoworkers expire this spring could knock the automotive market into a tailspin.

Outlook for plates took on a rosier hue with approval by the Federal Power Commission of plans by two companies to expand natural gas facilities, including construction of over 430 miles of pipelines. For producers of pipe plate, this means better business for a product which has been in the doldrums. Several other major pipeline projects are pending.

Transcontinental Gas Pipe Line Corp., Houston, will spend $29.7 million on 173 miles of 30 and 36-in. loop line and 58 miles of 12 and 16-in. line. Tennessee Gas Transmission Co., Houston, will spend $28.7 million for 243 miles of 24-in. pipe from Pennsylvania storage field to Greenwich, Conn., and 18 miles of 24-in. pipe to connect with the New York areas. Tennessee also has permission to spend $14.6 million for underground storage facilities in cooperation with two other companies.

Tight market in cold-rolled sheets, galvanized, and enameling sheets shows no sign of easing. Continued improvement is reported in silicon and stainless. Tinplate and oil country goods are beginning to perk up. Bars are better but still easy. Plate and structurals are coasting but outlook is good. Demand for manufacturers' wire is good and merchant products are expected to reflect improved farm demand shortly. Hot-rolled sheets and strip are improving. Merchant pipe demand is good.

Kaiser Steel will start construction of a $1.2 million warehouse addition at Fontana for pipe and structural shapes.

At a meeting of the American Steel Warehouse Assn. in Chicago last week, President Walter S. Doxsey predicted that steel warehouses would receive and ship more than 13.5 million tons of finished products during 1955. Of this amount approximately half will be industrial steel items, while the remainder will be merchant products and semifinished steel. C. L. Hardy, president of Joseph T. Ryerson & Sons, Inc., predicted a 10 pct increase in 1955 business for steel distributors.

SHEETS AND STRIP . . . In **Chicago**, cold-rolled sheets are sold through April, being booked into May-June; hot-rolled sheets extended to five weeks, maybe farther; strip moving up strong. **Cleveland** mills are booked cold-rolled into March, have booked April orders. In **Detroit**, some car producers are ordering for June delivery. The **East** reports cold-rolled averaging 12 weeks, hot-rolled about six weeks. **Pittsburgh** mills are sold through first quarter on cold-rolled, are being pressured for second quarter.

GALVANIZED SHEETS . . . Booked solid through first half in **Chicago**. In the **East**, one producer has accepted orders for July delivery, although other mills have limited futures to May. Any galvanized sheet producer can name his own ticket on how far ahead he wants to book.

STAINLESS . . . Demand is good from automotive companies and other consuming industries. McLouth Steel Corp. is running some trial stainless heats; it formerly bought stainless slabs from Rotary Electric.

BARS . . . Still no significant improvement. **Detroit** reports auto companies are having no trouble booking requirements in hot-rolled, cold-finished, and alloy in first quarter. Warehouse buying in **Chicago** is strong, except for alloy. Delivery promises of two weeks or less can be made by practically all producers. Merchant mill products are in good demand on the **West Coast**.

STRUCTURALS . . . Outlook is good. Slight improvement noted in **Pittsburgh** this month. Generally, the market is dull due to seasonal influences and effect of inventory reductions.

PLATES . . . While prospects look excellent, producers could use some orders. Railroads still holding back but mills are counting on pipeline orders to break soon.

PIPE AND TUBING . . . Oil country goods showing signs of emerging from inventory-correction slide. First-quarter ordering in the **East** is 10 pct over last quarter, and producers look for another 5 pct improvement in second quarter. Well drillings expected to be around 50,000-mark this year. National Tube Div. has started work on facilities at McKeesport to triple production of its 110,000 lb minimum yield strength casing, and substantially increase production of 80,000 lb minimum casing. It also will install new upsetting units at Lorain to increase production of external upset API tubing in the 2⅜ to 4½-in. O.D. range. Buttweld pipe market is good with prospects of improvement in the spring.

Purchasing Agent's Checklist

STEEL: Autoworkers wage settlement could set steel pace . . . . . p. 39

TITANIUM: Centrifugal casting production to start soon . . . . . p. 41

SCRAP: Economist predicts worldwide shortage upcoming . . . p. 42

COSTS: Industry trades tips on cost cutting . . . . . p. 45

APPLIANCES: Manufacturers see 1955 another record year . . . p. 47

Comparison of Prices

(Effective Jan. 18, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Jan. 18 1955	Jan. 11 1955	Dec. 21 1954	Jan. 19 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.613
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes. (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails. (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	Jan. 18 1955	Jan. 11 1955	Dec. 21 1954	Jan. 19 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$36.50	$36.50	$33.50	$30.50
No. 1 steel, Phila. area	32.50	32.00	31.50	27.50
No. 1 steel, Chicago	34.50	34.50	33.50	27.50
No. 1 bundles, Detroit	27.50	27.25	27.50	21.50
Low phos., Youngstown	36.50	36.50	35.50	31.00
No. 1 mach'y cast, Pittsburgh	43.50	42.50	42.50	43.50
No. 1 mach'y cast, Philadel'a	42.00	42.00	42.00	39.00
No. 1 mach'y cast, Chicago	45.00	45.00	44.00	35.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$34.50	$34.33	$32.83	$28.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75‡
Copper, Lake, Conn.	30.00	30.00	30.00	30.00
Tin, Straits, New York	86.75†	86.125*	85.625	84.50
Zinc, East St. Louis	11.50	11.50	11.50	9.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin ingot	23.20	22.70‡	22.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	27.75	27.75	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 131→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$8.00	$8.50	$9.00	$9.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	56.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1*, *G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	35.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.75	46.75	18.25	—	18.50
Forg. discs, die blocks, rings	30.00	30.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.75
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.50
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.25
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.50
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.75
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0/
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.7-

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Consumers Feeling Out Market

Scattered reports of mill buying indicate end of backlogs near . . . Export scrap moving steadily with prices firm . . . Composite moves up 17¢ to $34.50.

◆ SMALL TONNAGE purchases by mills in Eastern and Midwest scrap centers gave indication that increased post holiday melt schedules were beginning to take a toll of stockpiled scrap.

Re-entry of several mills in the Philadelphia market backed up against the continued movement of export scrap at prevailing rates sent the price of No. 1 steel up 50¢ in that area.

Reflecting this change THE IRON AGE Heavy Melting Steel Scrap Composite moved up 17¢ from last week to a price of $34.50 per gross ton.

With the exception of a price increase of $1 per ton in Pittsburgh, cast grades remained steady with only small tonnages reported moving.

Pittsburgh . . . A purchase by an independent consumer confirmed existing prices for steelmaking grades in this district. On an order for No. 1 and No. 2 heavy melting, the mill stipulated a differential of $2.50 depending on whether freight is $3 or below. Prices for No. 1 are $34.50 and $37, and for No. 2, $31.50 and $34. Tonnage involved is approximately 10,000. By establishing two prices the mill in effect recognized difficulty of obtaining decent scrap in sufficient quantity from local sources. Latest railroad list was somewhat higher. Cast grades are stronger.

Chicago . . . Chicago scrap was moving at a slightly slower pace last week but at good prices, which had been re-inforced by a scattering of new deliveries at going prices. But while actual trading was not strong, a number of reports of sales kept the trade on the alert. Reports of a general slowing were in direct conflict with rumors of sales at $36 in No. 1 steelmaking grades. The rumors could not be confirmed at press time. Cast continued strong and despite hesitation from buyers, turnings continued to hold good asking prices. Electric furnace, a grade that has been very sensitive to market dropoffs in the past, continued to move at last week's prices with no weakening.

Philadelphia . . . Continued strength in the export market plus the entry of several local mills for small tonnages gave a lift to the prices of steelmaking grades. A purchase of electric furnace bundles by a nearby consumer moved that grade upwards. Increased interest in small tonnages of railroad specialties, the first in some time, had a beneficial effect on the prices of two grades. Cast remains quiet with little or no foundry buying.

Cleveland . . . Market continued firm with one mill buying substantial tonnage of openhearth grades for shipment from out of town points within a $2 freight area. Move apparently due to shortage of these grades within city to supply booming auto production. Smaller buy also made by same mill within city at prevailing prices. One new market shift occurred at week's end when Interstate Commerce Commission reduced freight from suburban Walton Hills, home of new Ford stamping plant, from $2.13 to $1.44 into Cleveland. This compares with rate of $3.58 from there to Canton and the Valley making Cleveland competitive. The plant is now producing upwards of 10,000 tons monthly. Valley market continued firm but no major new buys. Cleveland market on low phos punchings plate incorrectly quoted last week due to typographic error. Price should be $33.50-34.50.

Buffalo . . . Failure of the local market to follow the recent rise in nearby centers has resulted in additional outside buying here. Prices on Valley orders, after freight costs, are within current ranges. Local mills are still refusing to alter bids as dealers continue to ship against old orders.

Detroit . . . Out of district offers boosted the price of No. 2 heavy melting a full $2.50 and other openhearth grades also took modest increases. Detroit sources are still reluctant to send much No. 2 scrap to other markets for fear of rejection. This has kept Detroit prices comparatively lower than in other areas although local consumers have had trouble filling orders at offered prices.

St. Louis . . . The steel operating rate in St. Louis industrial district jumped again 10 points this week to 87.3 pct. Buying and the movement of scrap continue at a steady rate.

Boston . . . Brokers are definitely disappointed in New England scrap market trade. They'd expected something of a boom and nothing happened. There are some trickles of demand for export bundles, but domestic buyers don't seem interested.

New York . . . Re-entry of domestic consumers as inventories are depleted, plus continued firmness of export demand, has sent all steelmaking grades up by 50¢.

Birmingham . . . The biggest buyer of steel scrap was back in the market this week for a fair supply of scrap at unchanged prices. Foundries also were buying actively and those who purchased late in December and early this month released shipments. A ship arrived this week at a Florida port for a cargo of scrap and another is due to arrive next week, giving the export market a boost.

Cincinnati . . . One mill bought a little less than 1000 tons of machine shop and shoveling turnings at $3 and $2 over market last week. Mill bought turnings in a hurry for use as cushion in electric furnaces. Additional buying expected in week or so.

West Coast . . . Scrap holding fairly static in San Francisco and Los Angeles. Prices, supply and demand are relatively stable. One cargo of scrap is being loaded out of Oakland for the Orient this week; another scheduled next week. Scrap prices in the Seattle market, however, advanced on an average of $2. Mills, dealers and brokers don't expect any more changes on the West Coast for the balance of this month.

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

Luria Brothers and Company, Inc.

MAIN OFFICE

LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

LEBANON, PENNA. — READING, PENNA. — MODENA, PENNA. — ERIE, PENNA. — DETROIT (ECORSE), MICHIGAN — PITTSBURGH, PENNA.

OFFICES

BIRMINGHAM, ALA. — BOSTON, MASS. — BUFFALO, N. Y. — CHICAGO, ILLINOIS — CLEVELAND, OHIO — DETROIT, MICHIGAN — HOUSTON, TEXAS — LEBANON, PENNA. — LOS ANGELES, CAL. — NEW YORK, N. Y. — SEATTLE, WASH. — PITTSBURGH, PENNA. — PUEBLO, COLORADO — READING, PENNA. — ST. LOUIS, MO. — SAN FRANCISCO, CAL.

EXPORTS-IMPORTS — LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, 16, N. Y. *Cable Address:* FOSENTRACO

Scrap Prices *(Effective Jan. 18, 1955)*

Pittsburgh

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and ms. turns.	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. punch'gs, plate	40.00 to 41.00
Heavy turnings	33.00 to 34.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	48.00 to 49.00
RR. steel wheels	41.00 to 42.00
RR. spring steel	41.00 to 42.00
RR. couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00

Chicago

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 1 dealers' bundles	34.00 to 35.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	39.00 to 40.00
Low phos. punch'gs, plate	37.00 to 38.50
Low phos. 3 ft and under	36.00 to 37.00
No. 1 RR. hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	42.00 to 44.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	50.00 to 51.00
Locomotive tires, cut	36.00 to 37.00
Cut boilers & side frames	37.00 to 38.00
Angles and splice bars	44.00 to 45.00
RR. steel car axles	43.00 to 44.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	44.00 to 46.00
Cupola cast	39.00 to 41.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	35.00 to 36.00
Malleable	44.00 to 45.00
Stove plate	33.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	25.00 to 26.50
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	33.50 to 34.00
Low phos. 2 ft and under	34.50 to 35.00
Low phos. punch'gs	34.50 to 35.00
Elec. furnace bundles	32.50 to 33.50
Heavy turnings	29.00 to 30.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	34.50 to 35.00
Rails 18 in. and under	47.00 to 49.00
Cupola cast	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.50
Cast iron car wheels	41.00 to 42.00
Malleable	41.00 to 42.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	41.00 to 43.00
Charging box cast.	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut struct'r'l & plates, 2 ft & under	37.00 to 38.00
Drop forge flashings	33.00 to 34.00
Low phos. punch'gs, plate	33.50 to 34.50
Foundry steel, 2 ft & under	36.50 to 37.50
No. 1 RR. heavy melting	34.00 to 35.00
Rails 2 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	.... 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	38.00 to 39.00
Malleable	.... 44.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by **THE IRON AGE** *based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.*

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	27.50 to 28.50
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.50
Cast iron borings	22.00 to 23.50
Low phos. plate	36.00 to 37.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.50 to 26.50
No. 1 busheling	30.00 to 31.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. plate	33.50 to 34.50
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles, openhearth	27.00 to 28.00
No. 2 bundles	18.00 to 19.00
New busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos. punch'gs, plate	27.00 to 28.00
No. 1 cupola cast.	.... 34.00
Heavy breakable cast.	.... 25.00
Stove plate	.... 30.00
Automotive cast.	.... 38.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	15.50 to 16.50
Cast. iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	34.00 to 35.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	45.50 to 46.50
Locomotive tires, uncut	32.50 to 33.50
Angles and splice bars	33.50 to 34.50
Std. steel car axles	34.50 to 35.50
RR. spring steel	33.50 to 34.50
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	33.00 to 34.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	34.00 to 35.00
Cast iron car wheels	33.50 to 34.50
Malleable	35.00 to 36.00
Unstripped motor blocks	32.50 to 33.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	22.50 to 23.50
Elec. furnace, 2 ft & under	24.00 to 25.00
Machine shop turn.	7.50 to 8.50
Mixed bor. and short turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.50 to $28.50
No. 2 hvy. melting	24.50 to 25.50
No. 2 bundles	20.50 to 21.50
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
*No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	29.00 to 30.00
Bar crops and plate	33.00 to 34.00
Structural and plate, 2 ft.	33.00 to 34.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	36.00 to 37.00
Rails, 18 in. and under	40.00 to 41.00
Angles & splice bars	38.00 to 39.00
Rerolling rails	41.00 to 42.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans	15.00 to 16.00

*Price quoted in effect Dec. 2, 1954 to date.

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	17.00 to 18.00
Low phos., 18 in. & under	36.00 to 37.00
Rails, random lengths	38.00 to 39.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 3 bundles	14.00
Machine shop turn.	6.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	24.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	24.00
No. 1 bundles	27.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	28.00
No. 1 RR. hvy .melting	28.00
No. 1 cupola cast.	$42.00 to 43.00

Seattle

No. 1 hvy. melting	$29.00
No. 2 hvy. melting	25.00
No. 1 bundles	21.00
No. 2 bundles	18.00
No. 3 bundles	14.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$26.00
No. 2 hvy. melting	23.00
No. 1 bundles	26.00
No. 2 bundles	23.00
Mixed steel scrap	20.00
Bushelings	21.00
Bush., new fact prep'd	24.00
Bush., new fact unprep'd	20.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, rerolling	35.00
Cast scrap	$42.00 to 45.00

You can't beat **Ohio Magnets** for

lower maintenance

In any application where magnets are subjected to severe blows, you need the extra structural strength of Ohio Magnets.

Take this rugged Ohio Welded Magnet. Outer ring is a single casting welded to top plate *on top* where weld can't get dented in. Add to this Ohio's strap-wound copper coils . . . longer-lasting insulation . . . non-remelting or asphaltum filling compound . . . armored terminal boxes.

No wonder Ohio Magnets require less maintenance. So for extra magnet life, extra magnet value — specify Ohio Magnets. Remember, Ohio Magnets lift larger loads longer — *especially with Ohio Magnet Controllers.* Send for Bulletin No. 112. Offices in principal cities listed in Classified Directory.

OHIO WELDED MAGNETS. 39 to 65" diameter. Lightweight models in 39 & 45". 6-coil types in 46, 55, 65"; 8-coil in 55 & 65". Weld on top where it can't get dented in. Also capsule coil over 45".

OHIO BOLTED MAGNETS. 12 to 65" diameter. 6-coil types in 39 to 65"; 8-coil in 55 & 65". Strap copper coils over 39". Bolts protected in recessed wells. Also capsule coil over 45".

OHIO BASKET MAGNETS. 55 & 65" 4-coil, & 65" 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45".

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CHESTER BLAND *President*

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Ohio gives prompt service in rebuilding and reconditioning magnets.

Aluminum Hits New Record

Production of primary aluminum and refined copper rose to new records in December . . . Total '54 aluminum output also a new high . . . Price round over—By *R. L. Hatschek.*

◆ DECEMBER was a big month in nonferrous production. As well as a postwar record in monthly slab zinc production (See THE IRON AGE, Jan. 13, p. 118), new alltime highs were set in production of refined copper and primary aluminum. It shouldn't come as any surprise, but the year's aluminum total was also a new alltime record.

From these late-1954 statistics, it is obvious that we are really off to a flying start in 1955.

ALUMINUM . . . December wrapped up the year in grand fashion for the aluminum industry. Primary production for the month hit an alltime record total of 127,056 tons. This, of course, brought the annual total to the anticipated record of 1,460,587 tons as compared to the previous record of 1,252,015 tons set in 1953.

But like the 1953 record, it's destined to give way to a new one during the next 12 months.

Generally speaking, November shipment statistics of the Aluminum Assn. show a fairly even keel as compared to the previous month's figures. As compared to a year ago they are considerably higher in the alloys predominantly civilian in application, lower in alloys used largely by the military.

As usual, the standout exception is foil shipments, totaling 7939 tons for November—the eighth new record of the 11 months tabulated in '54.

Following are November aluminum mill product shipments compared with October totals. Figures for all products are in net tons:

	Nov.	Oct.
Sheet & Plate, total	44,350	44,470
Non-Heat-Treatable	34,678	35,806
Heat-Treatable	9,671	8,664
Foil	7,939	7,405
Extruded products, total	13,011	12,930
Soft Alloys	11,198	10,856
Hard Alloys	1,813	2,074
Tube, Drawn, total	2,153	1,995
Soft Alloys	1,953	1,810
Hard Alloys	199	185
Rod & Bar, Rolled	6,042	5,735
ACSR & Cable, Bare	3,083	3,479
Wire, Other than Conductor	1,781	1,786
Forgings	1,952	1,914
Castings, total	11,525	11,864
Sand	810	885
Permanent Mold	6,041	5,634
Die	4,674	5,344

The latest price round, started recently by Reynolds Metals Co.'s 1¢ boost in pig and ingot, is now complete. Kaiser Aluminum & Chemical Co. and Aluminum Co. of America followed along quickly with 1¢ hikes in primary metal effective Jan. 12 and 13, respectively. All three firms have increased aluminum mill product prices by 1¢ per lb as well. This makes it a straight metal price increase.

COPPER . . . December 1954 seems to have been a good month for production records. Domestic copper refiners set themselves an alltime high of 133,523 tons during the month, an increase over the preceding month of more than 17,000 tons, according to Copper Institute figures.

Figures for producers outside the U. S. showed relatively small changes from November statistics: Primary crude production 130,103 tons (down 2900 tons); refined production 108,624 tons (up 2100 tons); deliveries to fabricators 109,528 tons (up 2400 tons); and refined stocks 181,529 tons (up 1900 tons).

Domestic picture showed considerably larger changes in some categories from the previous month: Primary crude output 85,581 tons (down 3200 tons); secondary crude production 12,225 tons (up 3200 tons); refined production 133,523 tons (up 17,400 tons); deliveries to fabricators 119,626 tons (up 700 tons); and refined stocks 47,108 tons (up 10,000 tons).

But total U. S. refinery output for the year was 1,311,249 tons as compared to 1,395,003 tons last year and primary crude output was only 863,939 tons, lowest since 1949. Secondary crude was also off for the year, totaling 102,545 tons as compared to 110,475 tons in 1953.

LEAD, ZINC . . . Both lead and zinc markets are coasting along with little change from day to day and even week to week. One action still being awaited by sellers of both is the request by General Services Administration for January stockpile tonnage. But, so far, Office of Defense Mobilization has not yet sent the necessary monthly directive to GSA. This should be forthcoming shortly.

Pricewise, both are stable, both are strong at present levels. Pressure for an increase in zinc definitely exists but continuing high domestic production plus price competition from imported metal is holding the lid down tightly.

NICKEL . . . The U. S. government has taken action to conserve tight domestic supplies of nickel.

Tighter restrictions are placed on export licensing of some types of nickel-bearing scrap during the current quarter by U. S. Commerce Dept.

In line with the stricter policy, exporters are required to show evidence of domestic unsalability to support application to ship out clean nickel alloy scrap containing less than 50 pct nickel.

This evidence is also required in support of applications to export contaminated nickel alloy scrap bearing 50 pct or more nickel, nickel-bearing stainless steel (Schedule B No. 654502), and Type S-816 nickel-bearing cobalt scrap (B No. 664526).

Pure nickel scrap and clean nickel alloy scrap bearing 50 pct or more nickel are not being considered for export.

As in the fourth quarter 1954, all other nickel alloy scrap is open-ended and excepted from special licensing requirements.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Jan. 12	Jan. 13	Jan. 14	Jan. 15	Jan. 17	Jan. 18
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	87.25	86.50	86.50	....	86.75	86.75*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices **Tentative*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet 0.032 in.	Flat Sheet 0.081 in.	Flat Sheet 0.136-0.249 in.	Plate 0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.8¢ to $1.97.

Rod, Round: Rolled, 1.064-4-5 in. 1100-F, 43.6¢ to 46.1¢; cold finished, 0.375-3.499 in., 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ¼-11/32 in., 63.5¢ to 50.1¢; ⅝-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 45.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42⅝ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 67¢; ½ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2⅛ to 5 in., 51.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $9; Forgings, $9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		65	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.79		48.86
Copper, h-r	48.76	45.11	
Copper, drawn		46.36	
Low brass	44.95	44.89	
Yellow brass	42.27	42.21	
Red brass	45.89	45.83	
Naval brass	46.39	40.70	41.96
Leaded brass			39.73
Com. bronze	47.38	47.32	
Mang. bronze	50.11	44.25	45.81
Phos. bronze	67.31	67.81	
Muntz metal	44.54	40.35	41.60
Ni silver, 10 pct	56.30		63.80

Beryllius copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.68
Rod, bar, wire	1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	23.20
Aluminum pig	21.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$130 to $135
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
ingot	27.75
Magnesium, sticks, 100 to 500 lb,	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$322 to $324
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$17 to $21
Platinum, dollars per troy oz.	$79 to $84
Silver, New York, cents per troy oz.	85.25
Tin, New York	86.75
Titanium, sponge, grade A-1	$4.50
Zinc, East St. Louis	11.50
Zinc, New York	12.00
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	30.00
No. 120	29.50
No. 123	29.00
80-10-10 ingot	
No. 305	34.00
No. 315	31.75
88-10-2 ingot	
No. 210	43.75
No. 215	39.25
No. 245	34.75
Yellow ingot	
No. 405	25.75
Manganese bronze	
No. 421	27.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	25.25-25.50
0.60 copper, max.	25.00-25.50
Piston alloys (No. 122 type)	22.50-22.50
No. 12 alum. (No. 2 grade)	22.50-23.00
108 alloy	23.00-23.50
195 alloy	24.00-25.00
13 alloy (0.60 copper max.)	25.00-25.50
ASX-679	23.00-23.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	24.50-25.00
Grade 2—92-96%	23.50-24.00
Grade 3—90-92%	22.50-23.00
Grade 4—85-90%	21.50-22.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	88.50
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25½
Yellow brass	19⅞	18¼
Red brass	23	22¼
Comm. bronze	23⅞	23⅛
Mang. bronze	18½	17⅝
Yellow brass rod ends	19⅝	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	29½
No. 2 copper wire	28
Light copper	26½
*Refinery brass	26

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28½—29
No. 2 copper wire	27 —27½
Light copper	25½—26
No. 1 composition	23¾—24¼
No. 1 comp. turnings	23½—24
Rolled brass	18½—19
Brass pipe	19 —19½
Radiators	19½—20
Aluminum	
Mixed old cast	14½—15
Mixed new clips	15½—16½
Mixed turnings, dry	14½—15½
Pots and pans	14½—15

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	26½—27
No. 2 heavy copper and wire	25 —25½
Light copper	23 —23½
New type shell cuttings	23 —23½
Auto radiators (unsweated)	17½
No. 1 composition	21 —21¼
No. 1 composition turnings	20½—21
Unlined red car boxes	18
Cocks and faucets	18
Mixed heavy yellow brass	14½
Old rolled brass	17
Brass pipe	18
New soft brass clippings	19
Brass rod ends	17
No. 1 brass rod turnings	16
Aluminum	
Alum. pistons and struts	8½— 9½
Aluminum crankcases	11 —12
1100 (2S) aluminum clippings	14½—15½
Old sheet and utensils	11 —12
Borings and turnings	7½— 8½
Misc. cast aluminum	11 —12
2024 (24S) clippings	12½—13½
Zinc	
New zinc clippings	7
Old zinc	5½
Zinc routings	3½— 3¾
Old die cast scrap	3¼— 3½
Nickel and Monel	
Pure nickel clippings	57
Clean nickel turnings	40
Nickel anodes	57
Nickel rod ends	57
New Monel clippings	28
Clean Monel turnings	21
Old sheet Monel	26
Nickel silver clippings, mixed	16½
Nickel silver turnings, mixed	13½
Lead	
Soft scrap lead	12 —12¼
Battery plates (dry)	6½— 6⅝
Batteries, acid free	4.35— 4.60
Magnesium	
Segregated solids	18½—19
Castings	17½—18
Miscellaneous	
Block tin	70 —75
No. 1 pewter	50 —55
No. 1 auto babbitt	45
Mixed common babbitt	12 —12½
Solder joints	17
Siphon tops	45
Small foundry type	16½—16⅝
Monotype	15 —15½
Lino. and stereotype	14½—14⅝
Electrotype	12½—12⅝
Hand picked type shells	10½—10⅝
Lino. and stereo. dross	6½
Electro dross	5

IRON AGE

STEEL PRICES

(Effective Jan. 18, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B1*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B3,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		3.95 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Wallingford, Conn.									6.20 *W1*				
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4 W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R3, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *S7,P6*	5.75 *B4,J3, S7*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$88.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.65 *K1*	7.25 *K1*		6.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*		4.30 *S2*		6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.00 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*		4.30 *S2*		6.40 *S2*		6.95 *S2*	

IRON AGE

STEEL PRICES

(Effective Jan. 18, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & heavier	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Coke* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B1*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B1*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass.										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4,R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*		5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3,Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.90 *I3, U1,Y1*	$7.50 *I3, U1,Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G2*	5.65 *G2*	5.575 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1,R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.95 *N3*	6.10 *S1,R3*	7.50 *R3*				$8.90 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.875 *P6*	$8.90 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F3*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F3, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Texas										4.925 *S2*			

† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.

STEEL PRICES

(Effective Jan. 18, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'rs. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*		
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							3.975 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Putnam, Conn.			5.95 *W10*								
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R3, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3*	4.30 *N4,R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I3,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5* 6.665 *C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R5*		5.40 *R5* 5.60 *B5,P8* 5.65 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3, P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3*	5.075 *I3, U1, Y1*	6.525 *M5* 6.625 *R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3, W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1,Y1, C10,R3*	4.30 *U1,Y1, R3*	5.40 *F2,Y1, C10*	5.075 *U1,Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1,Y1*	4.225 *U1,Y1, R3*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.05 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	16.75	W4.5	13.75	W0.5	16.25	3.0	16.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Pittsburgh *N1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheeling *W5*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.25	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Jan. 18, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425	7.30			
So. Chicago *R3*							
Ensley *T2*	4.45	5.35					
Fairfield *T2*		5.35		7.30		5.275	
Gary *U1*	4.45	5.35				5.275	
Ind. Harbor *I3*	4.45		5.425	7.30		5.275	
Johnstown *B3*		5.35					
Joliet *U1*		5.35	5.425				
Kansas City *S2*				7.30			11.50
Lackawanna *B3*	4.45	5.35	5.425			5.275	
Minnequa *C6*	4.45	5.35	5.425	7.30		5.275	11.50
Pittsburgh *O1*					11.00		11.50
Pittsburgh *P3*					11.00		11.50
Pittsburgh *J3*				7.30			
Seattle *B2*				7.60		5.425	12.60
Steelton *B3*	4.45		5.425			5.275	
Struthers *Y1*				7.30			
Torrance *C7*						5.425	
Williamsport *S5*		5.35					
Youngstown *R5*				7.30			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
Trans. 65	12.50	Grain Oriented	
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*R2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R5*); Zanesville (*A7*).

*Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*35.50	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire, Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire ¢/lb.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146		155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149			156	6.90	7.425
Atlanta *A8*	139	151		157	164	7.00	7.525
Bartonsville *K2*	139	151		157	164	7.00	7.55
Buffalo *W6*						6.90	7.30
Chicago, Ill. *N4*	137	149		155	162	6.90	7.45
Cleveland *A6*	142						
Cleveland *A5*						6.90	
Crawfordsville *M4*	139	151		157	159	7.00	7.55
Donora, Pa. *A5*	137	146		155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146		155	159	6.90	7.30
Galveston *D4*	139						
Houston *S2*	142	154			164	7.30	7.70
Johnstown, Pa. *B3*	137	149			162	6.90	7.45
Joliet, Ill. *A5*	137	146		155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148		157	161	7.00	7.55
Los Angeles *B2*						7.85	
Kansas City *S2*	142	158		167	164	7.50	7.90
Minnequa *C6*	142	154	155	160	168	7.15	7.55
Monessen *P6*	137	151			163	6.90	7.45
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	156	169		179	179	7.85	8.25
Portsmouth *P7*						6.90	7.90
Rankin, Pa. *A5*	137	146			159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C6*					179		
Sparrows Pt. *B3*	139			157	164	7.00	7.55
Struthers, O. *Y1*						6.90	7.55
Worcester *A5*	143					7.20	
Williamsport, Pa. *S5*			150				

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra Galvanized products computed with zinc at 11.0¢ per lb

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.22	7.51	7.78	6.89	.....	6.57	6.92	6.68	8.52	.....	.....	.....	.....
Birmingham	.15	6.35–6.50	7.35–8.10	8.25–9.00	6.60	9.60	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston	.10	7.23	8.23	9.42–9.52	7.47	9.65–9.85	7.34–7.57	7.49	7.20	8.60–8.70	12.60–12.80	12.45–12.46	15.15	15.10
Buffalo	.20	6.35–6.40	7.40[3] 7.45	8.86–8.84	6.70–6.75	.....	6.65–6.70	6.70–6.77	6.50–6.55	7.85[3] 7.90	12.50	12.15	[3] 14.85	14.75 14.80[3]
Chicago	.20	6.38	7.38	8.30	6.62	.....	6.52	6.69	6.51	7.50	12.25	11.90	14.60	14.55
Cincinnati	.15	6.49–6.53	7.37–7.42	8.25–8.30	6.86–6.91	.....	6.81–6.86	6.91	6.75–6.80	7.80–7.85	12.55	12.15–12.20	14.90	14.80–14.85
Cleveland	.20	6.38	7.38	8.45	6.72	.....	6.69	7.02	6.57	7.60	11.96	.....	.....	14.61
Denver		8.15	9.15	10.37	8.40	.....	8.10	8.15	8.30	9.27	.....	.....	.....	16.30
Detroit	.20	6.57	7.57	8.50–8.58	6.90	.....	6.80–6.85	7.16	6.79	7.77	12.45	12.10	14.80	14.75
Houston	.20	7.35	7.80	9.93	7.70	.....	7.35	7.60	7.70	9.50	.....	13.10	.....	.....
Kansas City	.20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07–8.27	.....	12.27	.....	.....
Los Angeles	.20	7.50	9.25	9.95	7.85	.....	7.45	7.65	7.45	10.15	.....	13.20	.....	16.35
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	8.24	.....	.....	.....	.....
Milwaukee	.20	6.47	7.47	8.21–8.39	6.71	.....	6.61	6.86	6.60	7.69	12.34	11.99	14.69	14.64–14.84
New Orleans	.15	6.70	7.65	9.23	6.80	.....	6.90–6.95	7.05	6.80	8.70–10.70	.....	.....	.....	.....
New York	.10	6.97–6.98	7.78–8.46	8.79[1] 8.99	7.36–7.56	.....	7.18–7.27	7.13–7.38	7.20–7.37	8.65–8.73[1]	12.63	12.28	.....	14.93
Norfolk	.20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.60	.....	.....	.....	.....
Philadelphia	.10	6.19	7.29[3]	8.09[4] 8.23	6.96	.....	6.49	6.54	6.74	8.19[3]	.....	11.66–12.21	.....	14.66
Pittsburgh	.20	6.38	7.38	8.30–8.50	6.72–6.75	.....	6.52	6.69	6.51	7.85	12.25	11.90	14.60	14.55
Portland	.20	7.60	8.75	9.05	7.85	.....	7.45	7.50	7.55	10.95	.....	.....	.....	.....
Salt Lake City	.20	7.65	10.20	10.70	9.05	.....	7.70	7.70–8.85	8.80	10.95	.....	.....	.....	.....
San Francisco	.20	7.55	8.95	9.35–9.85	7.80	.....	7.40	7.56	7.35	10.05	.....	13.20	.....	16.35
Seattle	.60	8.10	9.00	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.65	.....	16.30
St. Louis	.20	6.63–6.67	7.67	8.54–8.59	6.91	.....	6.81	7.09	6.80	7.89	12.54	12.19	14.84–14.69	14.45–14.84
St. Paul	.15	7.03	8.03–8.58	8.96	7.28	.....	7.19	7.35	7.16	8.26	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (3) 1000 lb or over. (4) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, New Britain, Conn. *S7**	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R7*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.73
Oil hardened manganese	.405
Special carbon	.37
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24 in., del'd N. Y...	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	8.95
4	40	28.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
⅝ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	*Discount, Case or Keg*
¾" or smaller	55	64
⅞" to 1¼" inclusive	58	66
1⅜" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

¾" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount *Bright*	*H.C. Heat Treated*
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
¾", ⅞", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
¾", ⅞", 1" x 6" and shorter	32	21

* Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list	33	43
Bulk, bulk list		
Quantity		
¼-in. diam. & under: 15,000- 99,999	59	17
100,000-199,999	63	25
200,000 & over	67	33
5/16-in. diam. & larger: 15,000- 49,999	59	17
50,000- 99,999	63	25
100,000 & over	67	33
All diam, over 3 in. long: 5,000- 49,999	59	..
50,000- 99,999	63	..
100,000 & over	67	..

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list	30	33
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller: 15,000- 99,999	15	17
100,000-199,999	23	25
200,000 & over	31	33

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick

	Per net ton
Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

	Bt. ⅝-in. grains
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.60
in sacks	43.75

Dead Burned Dolomite

	Per net ton
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	83.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective Jan. 18, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ..	36.00	0.15% C ...	33.75
0.025% C, Simplex ..	34.50	0.20% C ...	33.50
		0.50% C ...	33.25
0.06% C ...	34.50	1.00% C ...	33.00
0.10% C ...	34.00	2.00% C ...	32.75
65-69% Cr, 4-9% C			24.75
62-66 Cr, 4-6% C, 6.9% Si			25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.26

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 13.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.35¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-35% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 55-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn; Producing Point — Cents per-lb

Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	48.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 6.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $88.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.23

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 214%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

For light grinding and polishing

GRIND-O-FLEX

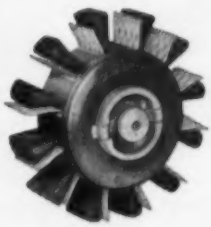
THE FLEXIBLE GRINDING WHEEL

This fast-cutting grinding wheel removes burrs, flash, tool marks from contoured parts without digging into the metal. Consists of hundreds of "leaves" of aluminum-oxide cloth sealed to a core. Attaches to your present power tools or any rotating spindle. No special equipment to buy. Wide range of grits. Safe and easy to use. Mount several wheels side by side for any required width. There's nothing like it.

For finishing complex contours

SAND-O-FLEX

BRUSH-BACKED ABRASIVE WHEELS



Use Sand-O-Flex for lighter and more intricate contour work on metals, plastics, wood, rubber, etc. Cannot gouge, "flat" or mar surfaces. Attaches to motor shaft or power tools. Available in four sizes from portable to heavy-duty production line models. Refill abrasive cartridges range from coarse to very fine for all types of finishing and polishing. Write for catalog and prices.

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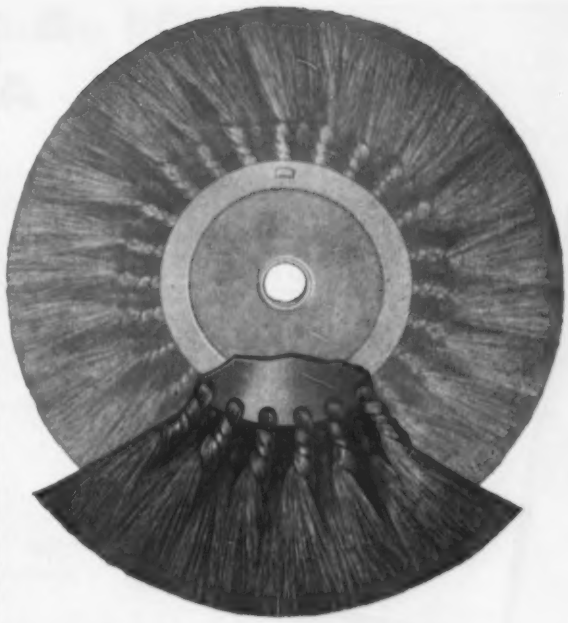

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- *Better Balance*
- *Uniform wear*
- *Better cleaning*
- *Longer equipment life*

Because of their construction, Pittsburgh "Lightning" knotted sections have *exactly the same number of wires in every knot.* As a result, you get a brush with perfect balance—one that will wear uniformly and cause less bearing—destroying vibration in the machine that drives it!

What's more, the special type of wire used in these knots is the fastest cutting, with the longest life, that can be produced. Built for the toughest applications, "Lightning" brushes are perfect for cleaning welds, removing scale or rubber, or cleaning parts where penetration brushing is needed.

This is just one example of superior Pittsburgh construction, engineered for both general and specific applications. For details of the complete line, write for free Catalog No. 54-W. Address: PITTSBURGH PLATE GLASS CO., *Brush Division,* Dept. N-1, 3221 Frederick Ave., Baltimore 29, Maryland.

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Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

A Frank Statement About Deliveries

The demand for sheet, strip and manufacturers' wire is continuing to put pressure on our schedules. That's why pulling "next week" deliveries out of our hip pockets is not so easy now. As against that we'll do everything our schedules permit to accommodate your more urgent needs.

What it means is that requirements should be anticipated a little further ahead and that delivery promises have to be realistic.

Here's Where We Stand on Delivery Promises

We will not knowingly overbook orders. We never go on the hope that we'll be able to take care of everybody, somehow or other, by hook or by crook.

We won't pyramid promises. That kind of policy can only lead to robbing Peter to pay Paul, and in the long run satisfies no one.

We won't agree to meet delivery requests unless we are reasonably sure we can. We would rather lose your order than chance disappointing you later.

We may sometimes hold back from committing ourselves to the delivery you name. 'Most always, however, we'll make the delivery we promise.

We're not implying that we never, never slip. We are saying that we won't make promises lightly—for your sake as well as our own.

Please call whenever we can be helpful

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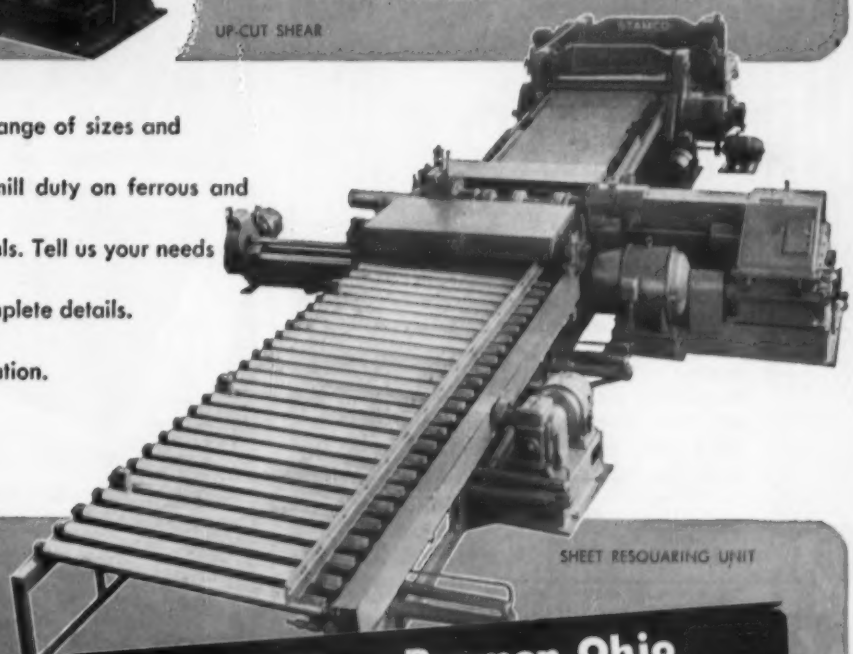

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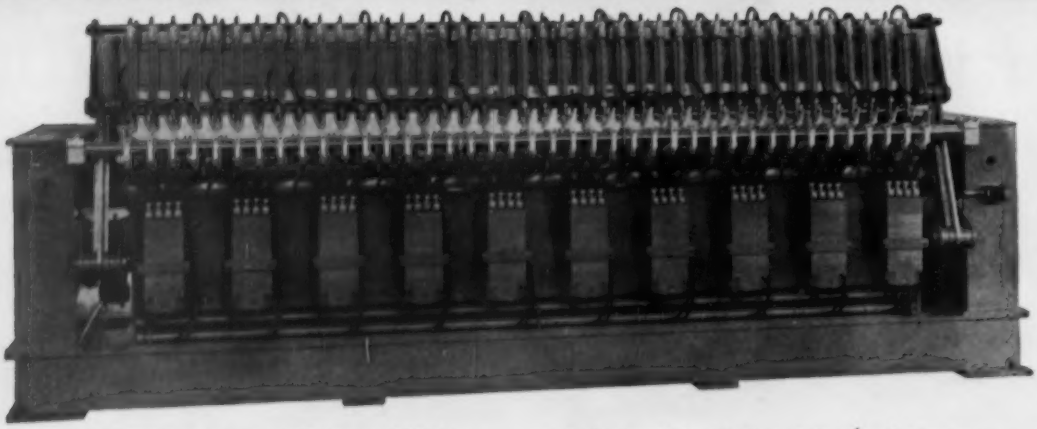
Standard 13 ft. Wire Mesh Welding Machine



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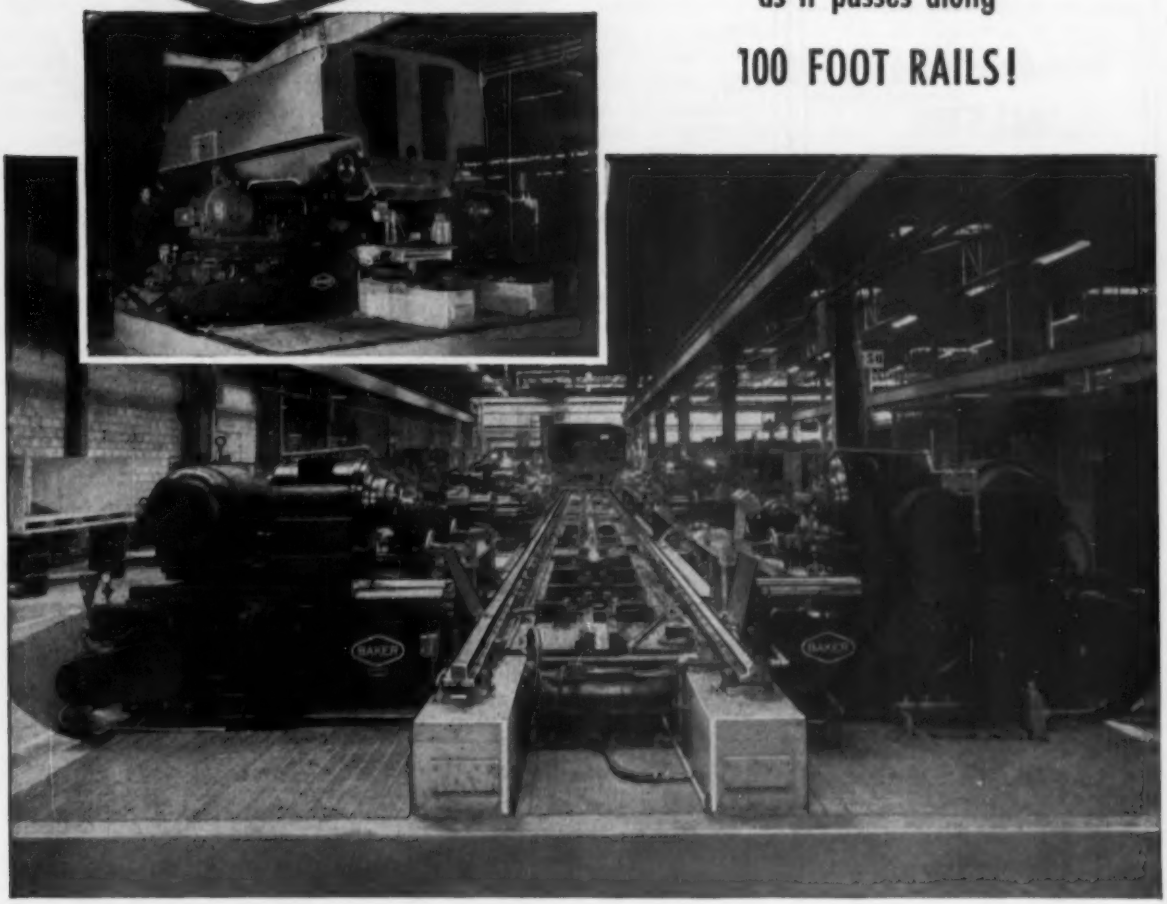

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Shoppers In Cleveland . . . A good many Cleveland firms are shopping around for used machinery these days, according to local dealers. But price has become a more dominant factor than ever.

What it boils down to is that expansions and replacements of machinery are progressing, but with extreme caution. Most buyers in the market for machinery are unwilling to spend more than $5000 for any machine.

One Cleveland dealer last week made one of his first major sales in weeks, a Heald 73A5 internal grinder. The buyer was a machine shop owner who had been offered a subcontract for aircraft work but did not have the equipment.

Saved $16,000 . . . Through going to a reputable local used machinery dealer he was able to buy the grinder, a 1943 model, for under $5000, although the equivalent new unit would have cost at least $21,000.

The grinder can hold to tolerances of 0.0001 in.—good enough for the precision work available. It was originally obtained through a government surplus auction. On the strength of the subcontract work, he should be able to pay for the machine and from then on show a good profit.

Seek Larger sizes . . . Hottest items in the Cleveland market are large press brakes and shears for sheet metal work. Most of the market is for 10 and 12 ft sizes and comes from independent shops going into these sizes from smaller type work.

There is also considerable demand for smaller units in the 4 pct class. These cost about $7000 new. Prospective buyers, however, expect to pay only about $3500, while dealers' price tags are about $5500 for postwar models.

On shears, the story is much the same. Biggest demand is for 10 ft sizes to handle ¼ in. material. These sell new for about $9000 to $10,000 and used price tags are about $7000 to $8000. Prospective buyers, however, will generally only offer about $5500 top, so the struggle continues.

Lathes, Presses Available . . . Items in easy supply and demand are lathes, drill presses, hobbers, chuckers and milling machines. Some ancient models 25 and 35 years old but still in good shape, are moving well. Price is something used machinery dealers have lived with a long time but most agree it has never been such a dominating factor as now. But the fact that there are buyers around who will close a deal if the price is right is far better than no market at all.

Upturn In Midwest . . . Fourth-quarter figures will probably reflect somewhat of an upturn for dealers in the Detroit-Chicago area compared to the doldrums of last summer. Reason for this: stepped-up production of 1955 autos in October brought some orders from subcontractors who held back till the last minute before buying a used machine to help meet production quotas.

The signs are good that volume will pick up, especially during first quarter and probably first half. No one is looking ahead any farther than that.

Electrical Dealers Optimistic . . . Electrical equipment dealers are encouraged by the pick up in steel mill production and sales. They also feel that perhaps the coal business will improve in line with the steel recovery, and greater use of electrical power.

Dealers in steel mill equipment have noted an increase in inquiries during December and believe that some deals which have been long pending will come through.

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#6 Size B6F Medart Centerless Automatic Bar Turning Machine, Capacity 1" to 6" incl.
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8' x ⅜" Bertsch Initial Type Bending Roll—LATE
10' x ¼" Bertsch Initial Type Bending Roll
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8' x ⅛" Dreis & Krump Size 186
10' x ⅛" Dreis & Krump Size 200
12' x ⅛" Dreis & Krump, Motor Driven
BRAKES—PRESS TYPE
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5 ton Niles — 65' Span 230 Volt D.C.
With A.C. Generator Set
5 ton P&H — 60' Span 220/3/60 A.C.
7½ ton Shepard Niles — 33' Span 220/3/60 A.C.
10 ton Shepard-Niles — 48' Span 230 Volt D.C.
10 ton Harnischfeger — 50' Span 220/3/60 A.C.
15 ton OKT — 45' Span 220/3/60 A.C.
15 ton Case — 90' Span 230 Volt D.C.
15 ton P&H — 97' Span 115 Volt D.C.
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1", 1¼" Acme
7/16", 8" AJAX with Air Clutch
1", 1¼", 2½", 3", 3¼", 4", 5" Ajax
1¼", 4", 5" National
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72" H & J 8 Rolls 4½" Dia.
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No. 6 Bliss OBI, 56 ton, 3" Stroke
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No. 74½ Bliss 90 Ton, 4" Stroke, 10½ Shut Height
No. 75½ Bliss 110 ton, 4" Stroke, 10" Shut Height
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13" x 18" Philadelphia 5-High Cold Rolling Mill
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SHEARS—ANGLE
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6x6x1" Long & Allstatter Size B
8x8x1" Long & Allstatter Size C
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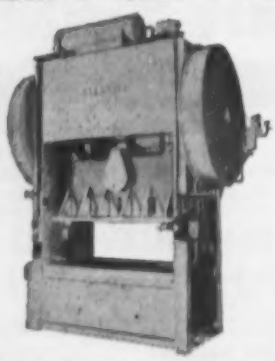

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1	200	G.E.	I-17A-M	2300	450
1	150	AL-Ch.	ANY	440	720
1	125	G.E.	MT-557	2300	1200
2	100	G.E.	I-16A-M	2300	495

SQUIRREL CAGE MOTORS

3 phase 60 cycle

Qu.	HP	Make	Type	Volts	RPM
1	400	G.E.	I-K	2300	514
1	300	Whse.	CR-890	2300	1750
1	200	Whse.	CR-873-C	2300	1160
1	200	AL-Ch.	AR	440	580
2	125	AL-Ch.	AR	2300	1750
1	125	AL-Ch.	AR	2300	490
1	100	Whse.	CR-445	440	1750
1	100	G.E.	KT-543	440	870
1	100	Whse.	CR-938	2200	495
1	75	AL-Ch.	AR	2300	690

SYNCHRONOUS MOTORS

3 phase 60 cycle

Qu.	HP	Make	PF	Volts	RPM
1	2000	Whse.	80	4800/2400	720
2	2100	G.E.	100	2300	360
2	2000	G.E.	80	2300	720
3	1750	G.E.	100	2200	3600
1	750	G.E.	80	2300	450
1	710	G.E.	80	2300/440	720
1	500	El. Mchy.	80	440	1200
1	350	G.E.	80	440/220	900
1	250	G.E.	100	2300	514
1	250	Whse.	80	440	600
2	200	Whse.	80	440	1200
1	187	G.E.	80	440	720
1	150	G.E.	100	2200	900
1	150	G.E.	100	550	600
3	135	G.E.	80	4000/2300	1200
3	135	El. Mchy.	100	4800/2400	900
3	100	Whse.	80	440	1800
3	100	G.E.	80	440	600

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5½" bar Niles-Bement-Pond, m.d.
6" bar Newton No. 2 Cylinder Borer, m.d.
10" bar Sellers Floor Type, m.d.
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1	2000	Whse.	MH	600	230/460
1	1300	G.E.	MCF	600	750/850
1	940	Whse.	QM	250	140/176
1	900	Whse.		250	450/550
1	825	Whse.		250	85/198
1	600	Al. Ch.		250	400/600
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	600	300/900
3	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
1	300/300	G.E.	MPC	230	360/920
1	250	G.E.	MPC	230	400/600
1	200	Rel.	1876T	230	720
1	200	Whse.	CB-5115	250	400/800
1	150	G.E.		600	256/750
1	150	Cr. Wh.	88H	230	1150
3	150	Cr. Wh.	88H-TEFC	230	800
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	HK-261	230	360/950
1	50/120	G.E.	MCF	230	250/1800
3	100	Whse.	SK-181	230	450/1060
1	100	G.E.	CDP-115	230	1750

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/300	2300/4600
3	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	900	25cy 660	11000
3	2000	G.E.	514	600	6600/13200
2	2000	G.E.	450	600	2300/4600
1	1500	G.E.	720	600	2400/13200
1	1500	C.W.	514	80/115	4000/13000
1	1000	G.E.	900	260	6600
2	1000	G.E.	720	550	2350/4600
3	750	G.E.	720	275	2300/4600
1	750	C.W.	514	80/115	2300
1	600	G.E.	720	250	440/2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	5000	Whse.	OIBC	3	2300x26400
1	3300	Whse.	OIBC	3	26400/13200x460
3	2000	G.E.	HVDDJ	1	66000x13800
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OIBC	1	13200x460
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2-450	G.E.	IEM-17B	900
400	G.E.	IM	600
350	Westg.	C.W.	450
300	Westg.	C.W.	1200
250	G.E.	IM-17A	600
200	G.E.	MTP-557	1800
2-200	Westg.	HP-155	600
150	Westg.	HP-155	600
125	G.E.	IM-15	600
100	G.E.	MT-347	1200
100	G.E.	IM	720
100	E.D.		514

SQUIRREL CAGE MOTORS

HP	MAKE	TYPE	SPEED
200	Wagner	RP2-28Z	1800
200	G.E.	KF-5635	900
200	Al. Ch.		900
150	Westg.	GS	1200
150	El. Machy.		1200
150	Cr. Wh.	SC-35B	1800
150	G.E.	IK-17	600
125	Cr. Wh.	SC-53B	3600
125	Al. Ch.	AR-226	1800
125	G.E.	IK	1200
100	Westg.	TEFC, CS-6078	3600
100	G.E.	KT-543	1800
100	Westg.	CS	1800
100	Westg.	CS	900

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SIZE	MAKE	CYCLE
10 KW	G.E.	15
10 KW	G.E.	25/60
200 KW	G.E.	25/60
5 KW	G.E.	120
230 KVA	G.E.	150
154 KVA	G.E.	150
15 KW	G.E.	180
25 KW	Howell	180
50 KW	G.E.	210
5KVA	Sterling	250
7½ KW	G.E.	120

DC MOTOR DRIVEN AC GENERATORS

SIZE	MAKE	INPUT VOLTS	OUTPUT VOLTS
50 KVA	Star	115	120
50 KVA	Westg.	230	230
81 KVA	Ideal	115	440
81 KVA	El. Machy.	230	440
12½ KVA	Cr. Wh.	230	240
10 KVA	Burke	110	120
7½ KVA	Hertner	115	230
5 KW	G.E.	230	240
5 KVA	El. Spec.	115	110
7½ KVA	Cont.	230	120
2½ KVA	K & B	115	230

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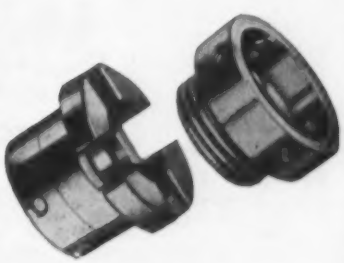

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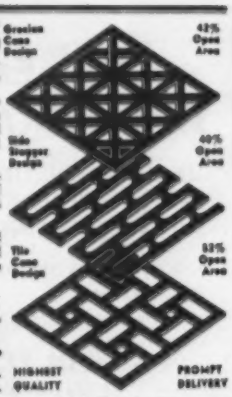

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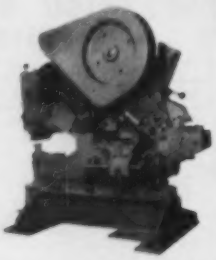

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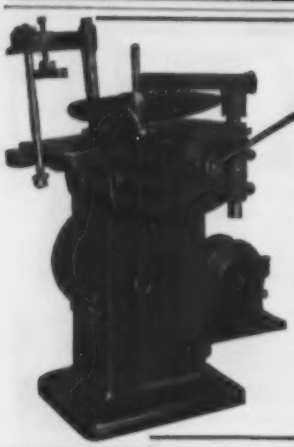

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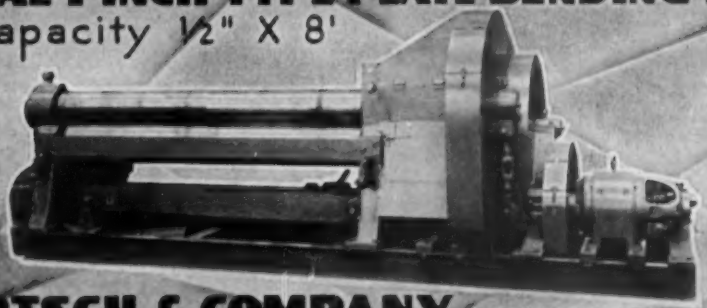

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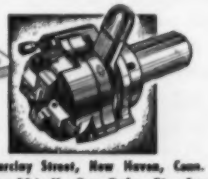

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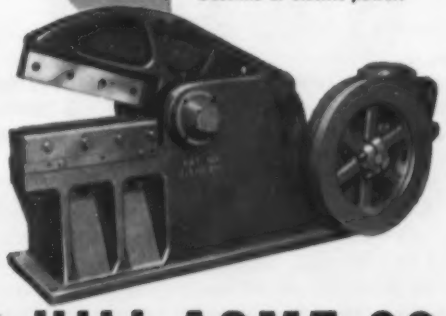

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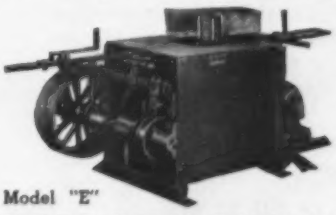

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Determining the Depth-Hardness of Alloy Steels

This is the eighth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

The hardenability of an alloy steel is usually measured by the depth to which the steel will harden under specific conditions of heating and cooling. One of the most conclusive methods of determining depth hardness is the end-quench hardenability test (ASTM A255). In essence, this test is as follows:

A 1-in. round specimen, approximately 4 in. long, is heated uniformly to the proper quenching temperature. The specimen is removed from the furnace and placed in a bracket; then a jet of water at room temperature is played on the bottom face of the specimen without touching the sides. This water jet is kept active until the entire specimen has cooled. Longitudinal flat areas are ground on opposite sides of the piece, and Rockwell C readings are taken at 1/16-in. intervals. The resulting data are plotted on graph paper, with the Rockwell C values as ordinates and distances from the quenched end as abscissae.

Experiments have shown that the points on the hardenability curve approximate the cooling rates at the centers of quenched rounds of various sizes; and that the hardness values at the centers of these rounds will correspond very closely with those shown at points on the end-quench hardenability curve.

In general it may be said that when end-quench curves for different steels approximately coincide, these steels can be treated similarly for equivalent tensile properties in sections of the same size.

A study of hardenability curves reveals that depth-hardness depends upon the amount of carbon present, the alloy content, and the grain size. Manganese, chromium, and molybdenum are the chief elements that promote depth-hardness, while nickel and silicon help to a lesser degree. It should be noted, also, that phosphorus promotes depth-hardness, while sulphur has a negative effect. In normal low-phosphorus and low-sulphur steels, the two elements neutralize each other.

Hardenability curves, and the practical application of data they yield, are the subject of intensive study by Bethlehem metallurgists. These technicians will be very glad to discuss all phases of it with you, and to give whatever help you may need in the selection, treatment, and uses of any alloy steel. Always feel free to consult with them. And please remember, too, that Bethlehem can furnish all AISI standard analyses, as well as special-analysis steels and the full range of carbon grades.

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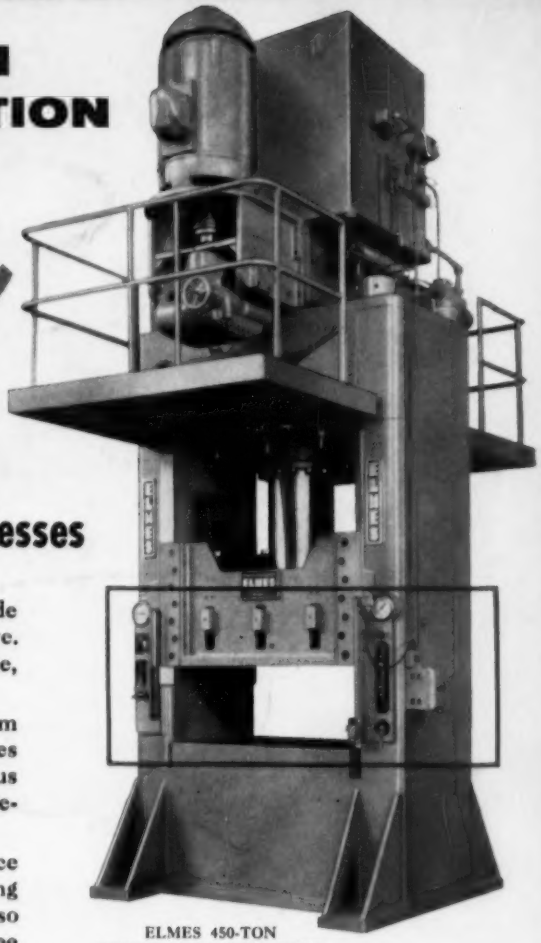

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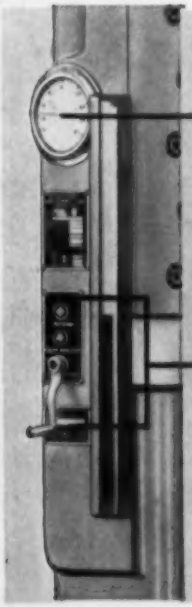

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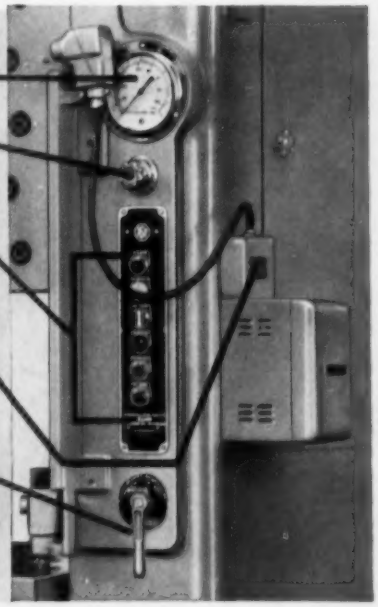

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